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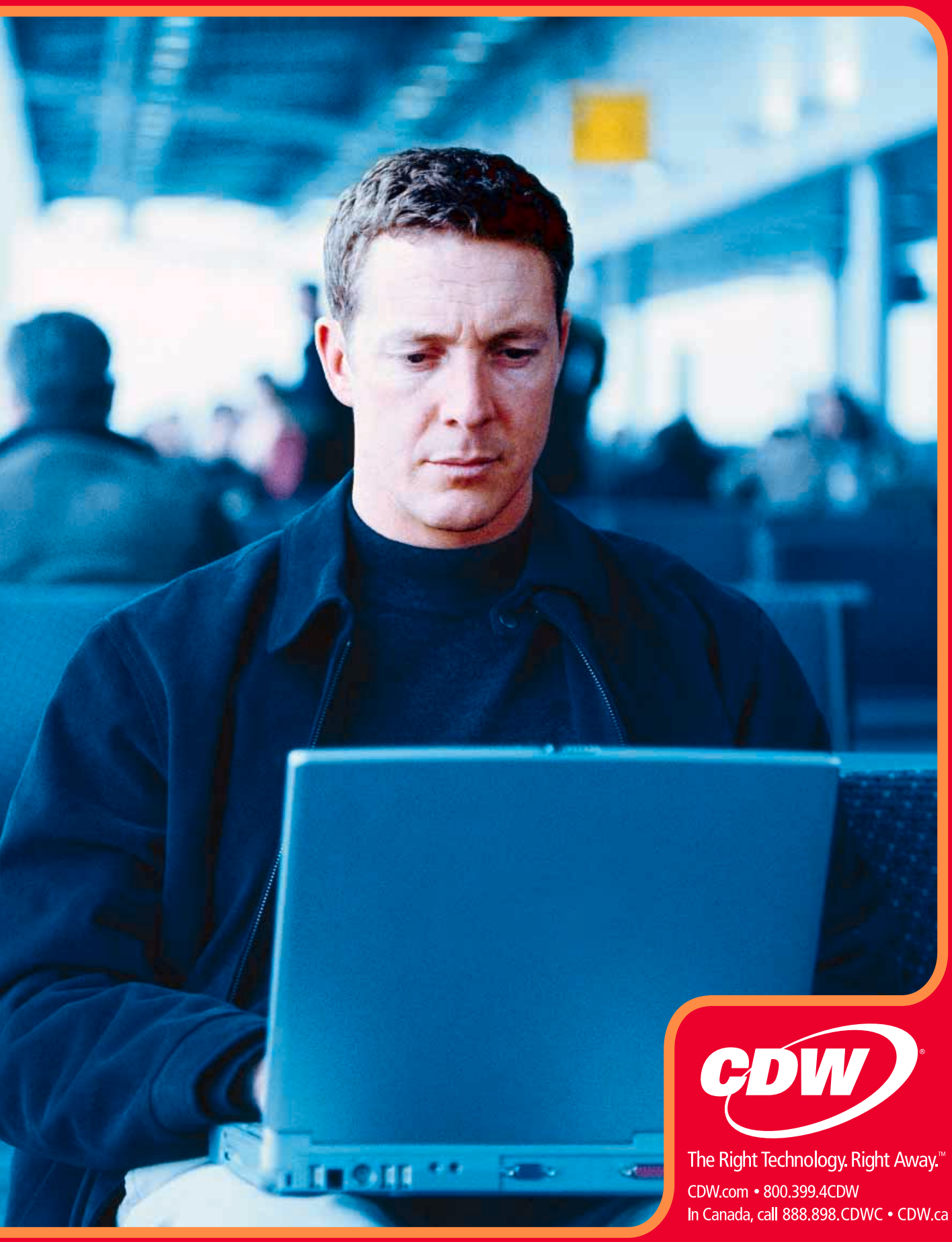
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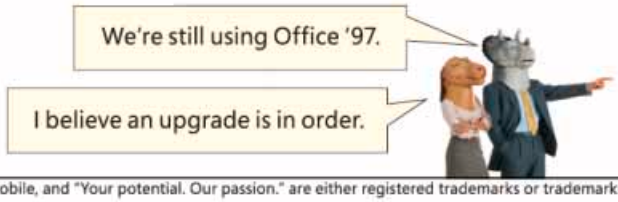

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SEPTEMBER 2005

VOLUME 23 ◆ NUMBER 9

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FEATURES

STORAGE

91 Big-Drive Backup

Personal finances, work documents, precious family photos, favorite tunes—your whole life is on your PC. If you lose the machine to a crash or a virus, having a complete, recent backup of your files is crucial. We tested 16 hardware devices and 7 software packages that promise to preserve and restore all of your data quickly and easily. Find out which products will work for you.

INTERNET TELEPHONES

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75 The Truth About Windows Alternatives

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ON THE COVER

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COMING UP IN OCTOBER

The Things Vendors Don't Want You to Know: Get the skinny on warranties, pricing, specs, and more.
Supercharged PCs: We test high-end systems to see what sets them apart, and what they're best for.
Make Your Own DVDs: Tips for putting your movies and photos onto DVD, from start to finish.
Browser Add-Ons: IE, Firefox plug-ins let you work faster, smarter, and more efficiently—and most are free.

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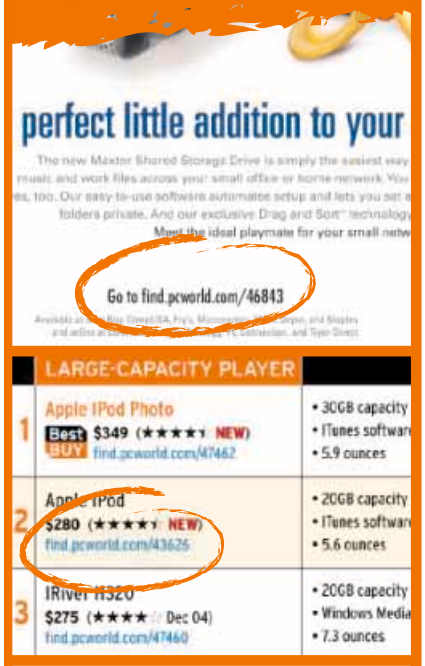

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UP FRONT

HARRY McCRACKEN

Technology on Trial: What's at Stake

Will legal clashes smother breakthrough products before they ever appear?

NINE OF THE MOST INFLUENTIAL PEOPLE in technology don't work in Silicon Valley or Redmond, Washington—and you won't see them giving keynote speeches at trade shows or hawking gadgets on TV. They're the justices of the U.S. Supreme Court, and on June 27 they concluded their term with two opinions likely to shape tech products and services for years.

We discuss one of these rulings—*NCTA v. Brand X Internet*, which determined that cable companies aren't required to let other ISPs piggyback on their infrastructure—in this issue's "Proposed DSL Rules Threaten Small ISPs" (page 22). The other decision was in the case of *MGM v. Grokster*, which pitted large media companies against Grokster and StreamCast, major purveyors of peer-to-peer software that music fans use to swap copyrighted material. In a unanimous decision overturning the Ninth Circuit Court of Appeals' judgment, the Supremes held that copyright holders could sue the two companies, and kicked the case back to the lower court.

The *Grokster* case is the latest in a series of courtroom clashes between Hollywood and tech companies dating back to 1984's *Sony v. Universal* (aka the *Betamax* case), which affirmed the legitimacy of Sony's VCR. Betamax flopped as a format, but the ruling has protected breakthrough products for more than two decades.

That's because it established that an invention doesn't lose its legal protections simply because it can be used unlawfully. "Your whole PC can be used for illegal stuff," points out Senior Editor Anush Yegyazarian, who looks at government's impact on technology in her *Tech.gov* online column (find.pcworld.com/46936). Without *Betamax*, it's possible that "you wouldn't have an MP3 player or a CD burner or a DVD burner, because they can all be used for illegal stuff."

Some court watchers feared that *Grokster* would undo *Betamax*'s consumer-friendly precedent. It doesn't. But it does introduce a new wrinkle: A court may hold a company responsible for illegal use of its products if it "induces" such behavior.

When the original Napster service lost its legal battle, Grokster and StreamCast went after displaced Napsterians. In doing so, the court found, they unlawfully egged users on to engage in massive piracy.

The *Grokster* ruling leaves an array of significant questions hanging. "The Supreme Court decision is unclear enough that we'll have to see how lower courts end up interpreting it," says John Palfrey, executive director of the Berkman Center for Internet & Society at Harvard Law School. Legal tussles yet to come are likely to clarify such unsettled matters as...

What's "inducement"? Explicitly touting a product's illegal abilities is now taboo. Could a company get in hot water for slyly implying that you can use its product in questionable ways?

How substantial is substantial? The ruling reaffirms *Betamax*'s imprimatur for products with substantial lawful capabilities, but the definition of *substantial* remains vague. If a new service is primarily used to swipe Hollywood blockbusters, how many fans of public-domain vaudeville footage does it need to stay in the clear?

What about copy protection? Products aren't required to include anti-piracy features such as digital rights management. But the ruling hints that ones that don't could compound any legal woes their makers run into.

The danger here is that companies—especially inventive startups without deep pockets—will avoid these murky legal waters by never developing anything that might antagonize Hollywood. "The worst fear is that innovative products...that trip up over *Grokster* won't get built," says Palfrey. "That's a real possibility."

Ultimately, I'm optimistic that the next generation of products won't get stuck in legal limbo forever. Content owners need technology companies; technology companies need content owners; both need paying customers. Let's hope that they remember this—and that the court of public opinion gets to render the final verdict on the future of digital entertainment. ■

Contact Editor in Chief Harry McCracken at mageditor@pcworld.com; read his blog at blogs.pcworld.com/techlog.

ILLUSTRATION: STUART BRADFORD

What's new and what's next in technology

NEWS & TRENDS

EDITED BY EDWARD N. ALBRO

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Copyright Crackdown

NEW TECHNOLOGY ON MUSIC CDs LIMITS THE NUMBER OF COPIES YOU CAN MAKE—AND GETS IN THE WAY OF PUTTING TUNES ON AN IPOD. BY LAURIANNE McLAUGHLIN

THE RECORD INDUSTRY has been targeting online music sharing for years, but now it has undertaken a new war—against "casual piracy."

Sony BMG and EMI have begun shipping compact discs using technology that limits the number of copies you can make of any disc to three. And you can't port songs from affected CDs to Apple IPod players unless you request a workaround from Sony.

The move, along with other recent developments in copyright protection such as the Supreme Court's ruling this summer in *MGM v. Grokster*, a copyright infringement case pitting Hollywood against the Grokster peer-to-peer network (see "Court Sets File-Sharing Limits" on page 15), could have a lasting impact on your entertainment choices. And you may not like the remix.

Sony BMG's copy-protected CDs incorporate First 4 Internet's XCP2 (extended copy protection) technology. The company is the first major label to offer XCP2-protected CDs to consumers, although Sony BMG already ships some CDs using MediaMax copy protection from SunnComm. The new effort uses different technology, but with the same end result for consumers: a limited ability to copy. By the end of this year, Sony BMG says, most of its CDs sold in the United States will incorporate one of these technologies.

EMI is employing a similar strategy with its CDs, using technology from Macrovision that lets you make just three copies; the first titles using the technology should be on sale in stores by the time you read this.

'SPEED BUMPS'

"OUR GOAL IS to create a series of speed bumps that make it clear to users that there are limits [to copying]," says Thomas Hesse, president of Sony BMG's Global Digital Business Group. "If you attempt to burn 20 copies and distribute them to all of your friends, that's not appropriate."

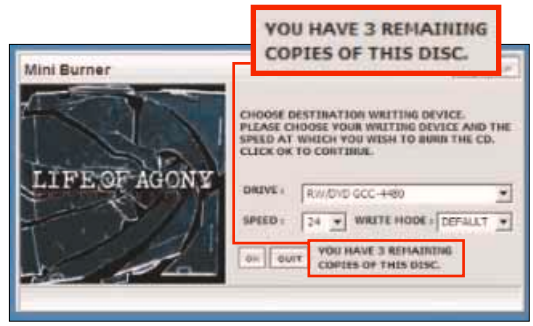
Sony BMG labels discs that use the technology as copy-protected. The company says that its customers find a limit of three copies to be fair.

When you insert the CD into your Windows-based computer, the disc launches its own audio player software, which warns you that you'll be allowed to make only three copies of the disc. You can

ILLUSTRATIONS: STUART BRADFORD; GORDON STUDER (FAR RIGHT)

make those copies from within the Sony BMG audio player, or you can use that software to rip the files to your music library. (For this purpose you must use a music player that supports secure Windows Media Audio files, like Musicmatch, RealPlayer, or Windows Media Player, but not Apple's ITunes.)

The copy protections are not iron-clad, however: You can make three copies of the CD on each PC on which you load it. You can also make three additional copies of the CD from the tracks that you have ripped to your Windows Media Player library. Once you have burned CDs using Windows Media Player, the tracks cease to be protected, and you can upload this audio CD into another media player, such as ITunes. And once the tracks are uploaded, you can burn them as often as you like.



SONY BMG CDs using the XCP2 technology launch their own software to track the number of copies you make.

One potential problem for consumers is that the protected CDs prevent PC users from moving songs to Apple IPods. That's because Apple refuses to license its FairPlay digital rights management technology so that other companies can accommodate it. If you inquire, though, Sony BMG will e-mail you a workaround (find.pcworld.com/48888).

This raises a key point about XCP2: It's not meant to be unbreakable, according to First 4 Internet's chief executive Mathew Gilliat-Smith. "We have achieved a good balance of protection and playability."

In fact, XCP2 is not as strict as XCP, the company's original product. Sony BMG and the other major labels have been using XCP since 2002 on prerelease CDs sent to radio stations and internal employees, Gilliat-Smith says. XCP not only prevents copying, but in some cases prevents discs from playing in certain devices, he says. Sony chose XCP2, not XCP, for consumer CDs because discs with that encryption play well in most devices.

XCP2 may affect more than just CDs: The company is currently working on versions for DVDs and online music files, Gilliat-Smith says. Sony ▶

ANALYSIS

COURT SETS FILE-SHARING LIMITS

THE LONG-BREWING COURT case of *MGM v. Grokster* finally came to a head in late June, when the U.S. Supreme Court ruled in favor of the recording industry. Movie and recording companies had sued Grokster and StreamCast Networks (owners of the Morpheus peer-to-peer service) for encouraging users of their peer-to-peer services to download and trade copyrighted songs without paying for them. Grokster argued that it wasn't liable for the actions of consumers using the service, but the Supreme Court disagreed.

Why should you care about this decision? For starters, the *Grokster* ruling will change the way courts interpret the precedent set by the famous *Sony v. Universal* (or *Betamax*) case of the mid-1980s. Movie companies had sued Sony, claiming that the VCR could help consumers break copyright laws; but the Supreme Court ruled in Sony's favor, declaring that if a product had significant legal uses, the creator was not responsible if some people used it illegally.

The *Grokster* ruling could affect the way companies design their products in the future, discouraging innovation.

It will probably be some time before the ruling's exact impact becomes clear. U.S. appellate courts must apply this Supreme Court opinion to cases before them. (For more on the ruling, see "Technology on Trial: What's at Stake," page 13).

What the *Grokster* decision won't do is shut down online piracy, says Forrester Research vice president Josh Bernoff. And record companies are still free to sue individuals for piracy.

IN BRIEF

Tidbytes

AMD TO INTEL: FIGHT! Chip maker Advanced Micro Devices is taking rival Intel to court, claiming the chip behemoth isn't playing fair. In an antitrust suit filed in June, AMD claims that Intel illegally maintains a monopoly on desktop, notebook, and server microprocessors. AMD says that Intel is using its market dominance to keep computer makers from buying AMD chips, consequently hurting fair competition in the marketplace. Intel strenuously disagrees with AMD and says that it will answer AMD's allegations when it gets its day in court. AMD hopes the case will go to trial by year's end.

SOFTWARE FOR SHARED PCs: Need help managing one or more Windows XP PCs that multiple people use—say, in a classroom or a library? Microsoft's Shared Computer Toolkit for Windows XP (get the beta at find.pcworld.com/48918) prevents users from making most system-level changes and, when a new user logs in, reverses any hard-drive changes made by the previous user. The software can also restrict user access to specific programs, settings, and files. Microsoft expects to offer final code by fall; pricing is to be determined.

BMG will ship the DVD technology to U.S. movie studios for use in prerelease copies of movies by late 2005, he hopes, and will introduce a version for commercial DVDs later. He declines to say which movie studios have expressed interest in using the technology.

WHAT'S FAIR USE?

NOT EVERYBODY thinks that record companies' focus on "casual piracy" is smart. Some copyright law reform advocates say that sharing copies of music with family members and friends and making "mix" compilations have long been social norms—it's the sharing with strangers that costs record companies significant revenue. If record companies insist otherwise, they'll make people ignore copyright rules wholesale, says Ernest Miller, a Yale Law School fellow who works on copyright reform issues. (See his blog at find.pcworld.com/48890.)

The term "casual piracy" is "really a bit of propaganda," according to Miller. "It's an effort to use language to frame the legal arguments," he says.

The record companies want to chip away at the existing standard for fair use and move casual copying into the realm of copyright infringement, he says. Someday, the definition of "casual piracy" could be important in a lawsuit.

What's next? Like it or not, copy protection on CDs will only increase, in the opinion of IDC senior analyst Susan Kevorkian. She expects that more companies will follow Sony BMG's lead. "There's a very narrow line between casual copying and proliferation of content online," she says.

As for the war against casual piracy, you should understand that Sony BMG is not looking to prosecute you for making more than three copies, Miller says. The company is really attempting to shape future legal battles.

"They're looking for ways to extend their control over music and charge for the various ways we use music," he says. Whether companies can do so and avoid a consumer backlash remains to be seen.

SUBSCRIPTION SERVICES

COPY CONTROLS MAY BE STALLING MOBILE MUSIC

USERS OF RHAPSODY 3, RealNetworks' newest version of its music service, weren't singing a sweet tune when the upgrade was released in May. When the software debuted, many users—including some *PC World* editors—had trouble transferring songs to music players. Yahoo's new Music Unlimited service (still in beta) has been serving up some similar glitches. Is the culprit Microsoft Windows Digital Rights Management 10 technology, which both Real and Yahoo are using?

Though some of the problems have now been fixed, Rhapsody's troubled debut illustrates how copy-control technology can alienate music customers. Real, in an effort to make its music portable, offered users the ability to copy songs to a music player for an additional $5 a month. To do so, Real relied on Microsoft's DRM, which is designed to allow users to play back music from a subscription service such as Rhapsody or Yahoo Music Unlimited on a portable player. The software makes the song unavailable as soon as your subscription ends.

FINDING A FIX

WITH SO MANY COMPANIES involved—Microsoft, Real, Yahoo, and the various device makers—it's hard to determine exactly what's causing the problem. "There are too many moving parts," says Mike McGuire, research director for GartnerG2.

Real and Yahoo both say that they are working on the problems and that reliability has improved since we first reviewed the services (see find.pcworld.com/48904 and find.pcworld.com/48905). Yahoo released

an upgrade in late June that corrects some bugs, notes Ian Rogers, a developer for Yahoo Music Unlimited, but he admits that it doesn't solve every problem. "The top customer service issues are related to DRM," Rogers says. "The biggest issue is, customers get into a state where the Microsoft DRM doesn't work anymore and they can't play protected tracks," he says.

Microsoft has developed a workaround, which Yahoo passes on to customers, Rogers says. The hitch has affected only about 1 percent of the service's users, he points out, but "for them, it's a show-stopper."

Real has released several updates for Rhapsody 3, including one in mid-June that addresses the top complaints, according to spokesperson Matt Graves. As for Microsoft DRM 10 failing occasionally, "it's something we've heard," Graves acknowledges. But he says that he doesn't know it to be a "significant" problem for Rhapsody users.

WORKING TOGETHER

MICROSOFT SAYS THAT IT is collaborating with music player makers to improve the devices' firmware and eliminate troubles. "Microsoft continues to work with our device partners to offer 'out of the box' support for the growing number of subscription music services, and we're making great progress," says Kevin Unangst, director of marketing for the Windows Digital Media Division. "We're working closely with our partners to ensure the best possible consumer experience," he says.

Even if you buy a player now, you may need a firmware upgrade from the vendor, says GartnerG2's McGuire. These companies have not done as well for consumers as Apple has with ITunes and the IPod, he says. "You have to make this appear seamless and easy the way Apple does," he says.

ILLUSTRATION: STUART BRADFORD

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MAPPING

Satellite Maps: The World on Your Desktop

GOOGLE EARTH, MSN VIRTUAL EARTH COMBINE SATELLITE IMAGES WITH LOCAL INFORMATION.

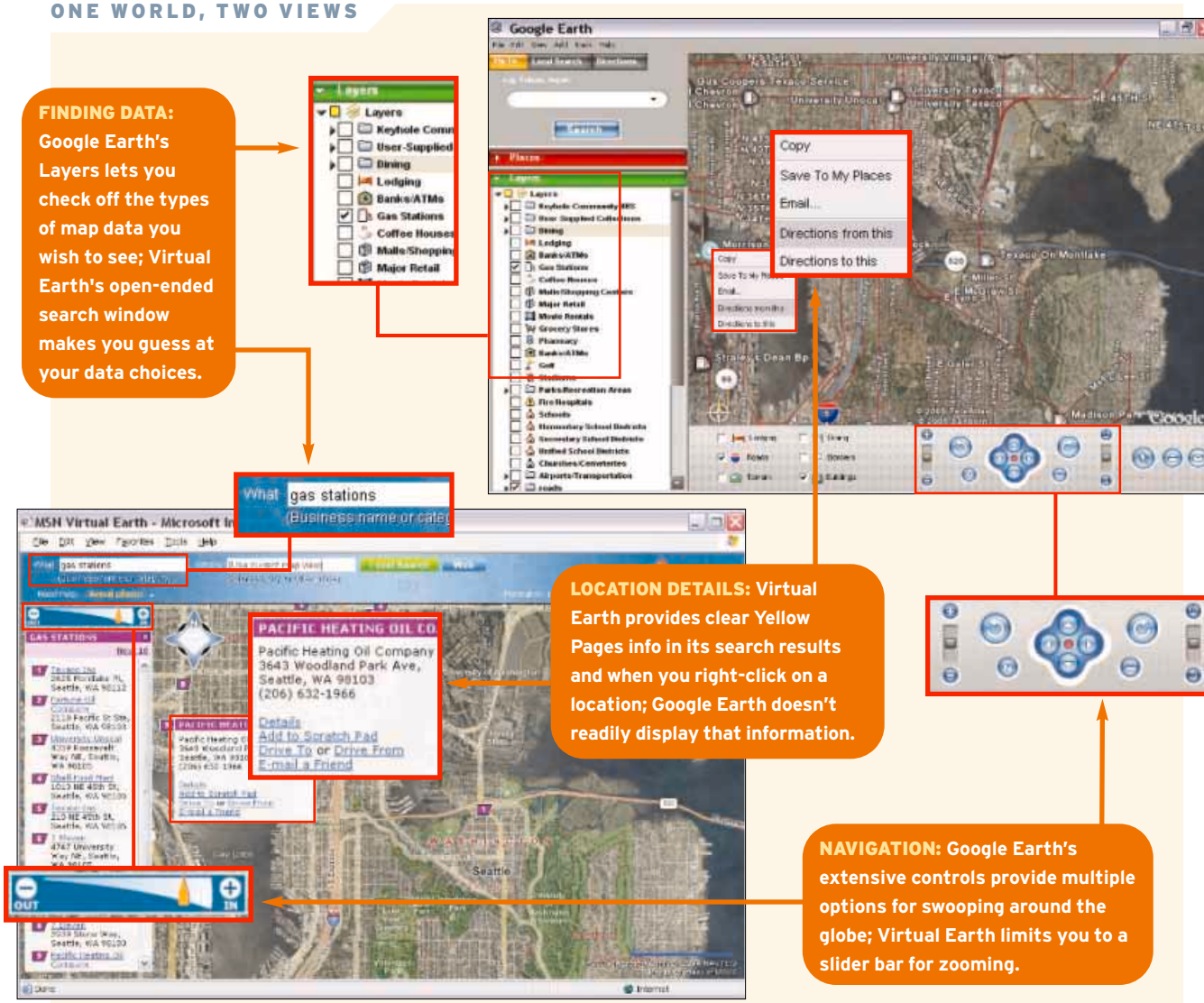
TWO NEW SERVICES bring the world to your desktop via satellite images that you can pan and zoom to get a bird's-eye view of a travel route or destination—or maybe just the stomping grounds of your youth. Google Earth and MSN Virtual Earth (both currently in beta) also provide Yellow-Pages info on businesses.

Google Earth (find.pcworld.com/48898) is a Windows desktop application that links Google Local search data with satellite images from Keyhole, a company Google acquired last year. The app currently provides medium-resolution images of the entire globe and high-res images for most of the United States and other areas of North America, Asia, and Europe. Its eye-popping graphics require at least a 500-MHz Pentium III PC with 128MB of RAM (512MB recommended) and 200MB of hard-disk space (2GB recommended). It's free for personal use; Plus ($20 a year) and Pro ($299 a year) versions add support and other options.

For now, Virtual Earth (find.pcworld.com/48946) covers the United States and major Canadian cities. But it works in any browser, and shortly should offer 45-degree-angle views of locations courtesy of Pictometry (www.pictometry.com)—great visual aids for exploring unfamiliar locales.

—Dennis O'Reilly

ONE WORLD, TWO VIEWS



FINDING DATA: Google Earth's Layers lets you check off the types of map data you wish to see; Virtual Earth's open-ended search window makes you guess at your data choices.

LOCATION DETAILS: Virtual Earth provides clear Yellow Pages info in its search results and when you right-click on a location; Google Earth doesn't readily display that information.

NAVIGATION: Google Earth's extensive controls provide multiple options for swooping around the globe; Virtual Earth limits you to a slider bar for zooming.

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STORAGE

Flash Memory to Speed Up Hard Drives

HARD DRIVES TURN TO FLASH MEMORY FOR FASTER BOOT TIMES AND LONGER BATTERY LIFE.

NO MORE long waits for your PC to wake up. Longer laptop battery life. Data that survives a drop. These are the promises of solid-state-memory disks (SSDs), which use flash memory to supplement or replace today's hard drives.

Samsung is working on two types of products: pure SSDs and hybrid drives that combine traditional hard disks and flash memory. Pure SSDs give you all the benefits listed above but cost a lot more than today's drives. Hybrids will offer extended battery life and faster boot-ups, but should have only a small price premium (if any).

Gigabyte takes another approach: a PCI card with RAM that your system can use as a drive. The card should offer faster data access, plus energy savings, but it needs constant power to store your files.

FLASH DRIVES

ENTERPRISES ALREADY USE SSDs; such drives cost thousands of dollars per gigabyte. But flash has grown more affordable, making mainstream use viable. "More affordable" is relative, of course: Flash's cost per gigabyte is still over 50 times that of a hard disk.

This premium buys a drive that doesn't rely on power-hungry spinning platters with mobile read/write heads perched near data surfaces. The end result is longer laptop battery life—over 30 minutes longer, vendors estimate—and lower energy bills when you're plugged in, plus more protection for your data when your system endures rough handling. Another perk: If you now wait seemingly endless seconds for your PC to reboot, an SSD may save several seconds each time.

Samsung's drives, which should be shipping before you read this, will include 1.8-inch and 2.5-inch versions in capacities ranging from 2GB to 16GB, with an additional 2.5-inch 32GB model (their prices are not yet set). The SSDs will replace traditional drives first in subnotebooks and tablets.

MIXED STORAGE

MICROSOFT and Samsung's planned hybrid drive should provide better battery life and shorter wake-up times, with negligible additional costs. Whenever your laptop idles or goes to sleep, you can save apps and files to the hybrid's 64MB or 128MB of fast (see the chart) flash memory instead of to the conventional portion of the drive. The data stored in flash will be available almost instantly, saving time at wake-up and boot-up.

The flash part of a hybrid drive will also function as a sort of supercache that's large enough to let you work using only the data stored there. That not only grants you a bit more speed, it allows both the mechanical part of the drive and normal cache memory to power down for long periods—with a resulting drop in battery use.

To use the supercache, your PC's operating system must support the technology. Microsoft plans to include that support in the next Windows OS, which is due out next year.

RAM DRIVE

YOU DON'T need flash memory to gain SSD-like benefits. Gigabyte's $50 IRAM PCI card (find.pcworld.com/48954) uses up to 4GB of DDR RAM to create storage that looks like a normal hard drive to your PC. Coming this summer, the IRAM can improve your PC's performance, save power, and reduce the wear on your hard drives. A rechargeable battery can preserve data for about half a day during a power outage, but don't permanently store vital data on the card.

Hybrid drives or Gigabyte's card should offer a good balance between price and performance. But until costs drop further, many users may find that the extra data security and power savings aren't worth the steep costs of pure SSDs.

—Jon L. Jacobi

DRIVE RIVALS

FLASH VS. RAM VS. HARD DISK

FLASH MEMORY offers lower power and some extra stability over a hard disk, but costs much more.

STORAGE TYPE	Price per gigabyte	Sustained transfer rate (read)	Bottom line
DDR2 533 RAM	$86	4.2GB/second	Fast but pricey, with no moving parts, making data a bit more secure against loss due to jostling; it requires constant power to store data.
Solid-state flash	$75	58MB/second	Fast but pricey low-power storage with no moving parts, which makes data a bit more secure against loss due to jostling.
2.5-inch hard disk	$1	34.5MB/second	Inexpensive, but it's designed with moving parts, so it needs especially careful handling; power consumption is higher than with flash.

Speeds provided by Samsung. OEM pricing provided by IDC, a research firm. Prices projected for end of 2005.

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INTERNET ACCESS

Proposed DSL Rules Threaten Small ISPs

FCC MAY RELEASE PHONE COMPANIES FROM OBLIGATION TO LET OTHER ISPs LEASE DSL LINES.

CAROLE SUMLER OF Santa Monica, California, wants her Brand X Internet—and fears the Federal Communications Commission will take it away.

Sumler, Webmaster and online community manager for The Dream Exchange (www.thedreamexchange.com), a social networking site, is a loyal customer of Brand X Internet, a tiny Southern California DSL service provider.

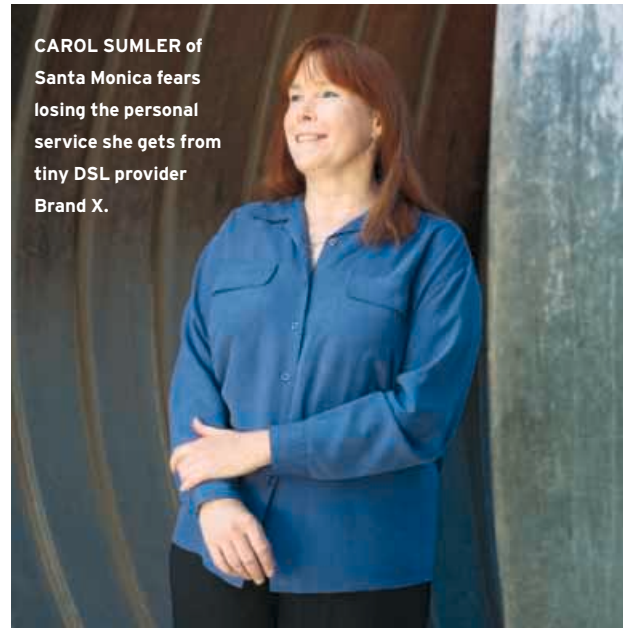
In June, the U.S. Supreme Court rejected Brand X's bid to gain access to cable networks' broadband lines. Ironically, that decision could indirectly also cost Brand X and other ISPs access to phone lines, making it impossible for them to offer DSL service.

In its lawsuit against the FCC, Brand X argued unsuccessfully that cable companies, like phone companies, should be required under the Telecommunications Act of 1996 to share their lines with third-party broadband providers. The Court sided with the FCC, however, upholding the cable companies' long-standing practice of excluding most third-party broadband providers from their networks.

In the wake of this decision, the FCC has hinted that it may release phone companies from their obligation to lease their DSL lines to competitors such as EarthLink and Brand X.

"This decision provides much-needed regulatory clarity and a framework for broadband that can be applied to all providers," said FCC chairman Kevin Martin after the judgment was handed down.

The FCC is currently reviewing its regulations for DSL providers but hasn't publicly announced a timeline for making any changes. Jupiter Research senior analyst Joe Laszlo believes that the FCC will not alter its existing DSL policy before mid-2006 at the earliest. "Any substantial change takes a while," he says.



CAROL SUMLER of Santa Monica fears losing the personal service she gets from tiny DSL provider Brand X.

PERSONAL SERVICE

IF SMALL PROVIDERS such as Brand X can't lease broadband lines from cable or phone companies, they'll be out of business. But Sumler doesn't relish the prospect of switching to a larger broadband ISP, which she believes would not deliver the support and personal attention she gets from Brand X, a Santa Monica–based service provider that has a mere 350 subscribers.

When service issues arise, Sumler often speaks directly with Brand X president Jim Pickrell. "If I don't talk with Jim, I talk with one of the support staff," she says. "I tell them what the problem is, and they get it done right away."

It may be a bit premature to sound the death knell for DSL mom-and-pops, however. The phone companies make a nice profit by leasing DSL lines wholesale to large ISPs. But while a deregulated phone industry would likely continue to do business with large DSL providers like EarthLink, the future is murky for smaller players such as Brand X, which don't generate much profit for the telcos. "Many smaller ISPs will get bounced out," predicts Jim Murphy, president of DSL Extreme, a Winnetka, California, broadband provider with 50,000 subscribers.

While Jupiter's Laszlo concurs that phone companies profit from wholesale DSL deals, he says they're not necessarily thrilled about them.

"Cable and phone companies are focused on selling a bundle of services that includes broadband, TV, and phone," Laszlo says. But it's hard to market a DSL, phone, and TV bundle to someone who already has DSL service.

Over the past four years, FCC officials have said that they want to allow cable and phone companies to reap the rewards of their broadband investments, which the officials say would motivate the companies to provide broadband in more areas and to develop technologies to increase high-speed bandwidth, thereby spurring the adoption of high-speed Internet service. But according to Jupiter's Laszlo, price, not lack of availability, is the primary obstacle to increased broadband adoption. "When we ask U.S. consumers why they don't have broadband, the number one answer we get is, 'It's too expensive,'" he says.

So would fewer broadband providers benefit the public? Laszlo says no. "More competition is better than some competition....Consumers would be helped by a broadband landscape with, say, five choices instead of two."

—Jeff Bertolucci

PHOTOGRAPHS: ANN SUMMA

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PLUGGED IN

STEVE FOX

Yahoo Searches Get Social Boost

PLUS: MICROSOFT HELPS OUT RSS, AND A HARD-DRIVE CAMCORDER.

SEARCH WITH A LITTLE HELP FROM YOUR FRIENDS

The Buzz: Yahoo's My Web 2.0 (find.pcworld.com/48907) is borrowing a page from the social software movement to sharpen its search efforts. Here's how it works: You save, label ("tag"), and comment on Web pages you view, and then you share that information with a community of your choosing—friends, colleagues, or all My Web users. Other people do the same; then, whenever you search, Yahoo personalizes your results, weighting them to take into account what your community has identified as most useful. It's the same principle that drives Amazon's product recommendations, networks like Friendster or LinkedIn, and bookmark services like Del.icio.us.

Bottom Line: Search is rapidly evolving from blunt tool to finely tuned instrument. Witness not only My Web 2.0, but also localized search and personalized search services from Google and others. Yet I still can't ever find my keys.

LONGHORN AND RSS

The Buzz: Details of Longhorn, Microsoft's next operating system, keep trickling out. The latest nugget: RSS support, built right into the OS itself. RSS—or Really Simple Syndication—lets content providers (Web sites, bloggers, and others) deliver headlines, news, links, and even multimedia "enclosures" to subscribers via an RSS feed (basically a text document). With Longhorn, subscribing to RSS feeds in Internet Explorer 7.0 will be much easier; simply click the iconic 'XML' button on the page, and you'll get the feed delivered to your browser. A common feed list will make those subscriptions available to other applications such as e-mail and scheduling programs.

Bottom Line: By making it easy, Microsoft removes a major impediment to RSS use. Looks to me like RSS is about to get some R-E-S-P-E-C-T.

BIG STORAGE IN SMALL CAMCORDERS

The Buzz: It's about time: Everio G camcorders from JVC replace conventional tape or removable disc storage with gel-encased 20GB or 30GB hard drives. The tiny 0.7-pound cameras can hold 5 to 7 hours of DVD-quality video, or up to 30 hours in lower-quality mode. Priced at $800 to $1000, the models come equipped with either a 640-kilopixel or a 1.3-megapixel CCD and with a 25X or 15X optical zoom, respectively. And butterfingers can take heart: The drives have drop protection, so you won't lose data if the unit falls off the table.

Bottom Line: Just imagine: 30 hours of home videos. If my Uncle Phineas (with his four kids) gets one of these, I'm leaving the country. ■

Contact PC World *Contributing Editor Steve Fox at steve_fox@pcworld.com; visit find.pcworld.com/31643 to read additional* Plugged In *columns.*

ILLUSTRATIONS: GORDON STUDER

HERE\NOW

1 THINKFREE OFFICE 3 Free Java-based Microsoft Office-compatible suite can be launched from a browser. (thinkfree.com)

2 ATHLON 64 FX-57 AMD's blazingly fast but pricey new chip is made to order for gamers.

3 4INFO.NET Fire off an SMS message, and get localized info in return—from flight data to sports scores.

4 KLIPFOLIO On-screen dashboard delivers news, weather, tools, and more. (serence.com)

5 SPELL WITH FLICKR Wacky art-house fun: Type in a phrase and see it spelled out in images. (find.pcworld.com/48908)

FUTURE TECH

Liquid Camera Lenses

CAMERA PHONES REQUIRE tiny, durable, low-powered lenses. Hence the excitement over liquid lenses—rugged, inexpensive little devices that have no moving parts. Developed by French optical pioneer Varioptic, the latest liquid lenses zoom and focus automatically, just as the human eye does. An "electrowetting" process deposits two drops of fluid between lenses and then applies electricity to alter their curvature, changing their focal length on the fly. Samsung is working to incorporate Varioptic's technology into an autofocusing camera phone due to appear later this year.

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LETTERS

LETTERS@PCWORLD.COM

RATING FIREFOX'S SECURITY | BUT CAN YOU PUSH THE BUTTONS? | TAKING AIM AT TECHNO-SNOBBERY

SOFTWARE USERS' RIGHTS

I FOUND Anne Kandra's article about software end-user license agreements (EULAs) excellent but also very discouraging ["Software Licenses: Fight for Your Rights," *Consumer Watch,* July]. The real power to fight this monster lies with publications like *PC World*. When reviewing software, it should be as important to rate the EULAs as it is to assess the product's features. If that happened often enough, software developers might think twice about imposing onerous and unethical license conditions on their customers.

Terry J. Stone
Birmingham, Alabama

WHEN WINDOWS XP came out, I read the EULA and found it unacceptable. Then I read about the Free Software Foundation's GNU General Public License for Linux and other open software—it allows you to use, copy, distribute, and change open-source code as you see fit, but you must also pass along all of the rights that you received (you can read a copy of the license at find.pcworld.com/48860).

To me, the best way to fight for your rights is to use a GPL-licensed operating system and GPL productivity software.

Eric Skalwold, Ithaca, New York

BEST PRODUCTS OF 2005

I LOVED "The 100 Best Products of 2005" [July], but I must disagree with your decision to include video games and game devices—specifically the Sony PlayStation Portable. The article on the PSP in the June issue ["Close-Up: PlayStation Portable," *Digital World*] was a graphics-heavy page that did little to explain what playing it was like. Its Web link did a nice job of further explaining the unit, but still said little about how it plays. So I fail to see how it's impressive enough to weigh in at number 19. I can understand why every other product on your Best list got where it is (you've given them in-depth reviews), just not the video game items.

Kyle Covino, Williamstown, Vermont

I RECEIVED THE July 2005 issue in today's mail, read it cover to cover (as usual), and then went in and downloaded your Product of the Year [Mozilla Firefox]. I have only one comment: WOW!

George M. Slater, Melbourne, Florida

YOU CERTAINLY confused me in your July issue. On one page [*Privacy Watch*] you caution that Mozilla Firefox has 28 security holes, and on another page it is first on your list of "The 100 Best Products of 2005." Firefox is just as chancy as our good friend Internet Explorer.

Robert Kramer, via the Internet

Editors' response: All software has bugs, but according to the security firm Scanit (find.pcworld.com/48894), Firefox was vulnerable to publicly known security threats for far fewer days during 2004 than Internet Explorer. For more on Firefox—and why it impressed us—see find.pcworld.com/48870.

—Grace Aquino and Andrew Brandt

THE SCOURGE OF SPYWARE

ANDREW BRANDT'S ARTICLE "Can You Trust Your Spyware Protection?" [*News and Trends,* July] rekindled the anger I have toward spyware. As a computer technician for a southern university, I know that spyware is an ongoing issue for all of our clients. Unwanted and often disruptive spyware costs everyone time and money, and wastes resources that could be better utilized elsewhere.

To hear that some companies responsible for these malicious applications are complaining about being unfairly treated just takes the cake.

My definition of spyware is any application that installs itself without the express consent of the client. Applications that install themselves without warning or permission should be treated as hacking attempts, and the companies responsible for them sanctioned, fined, and sued to the maximum extent of the law.

Doug Robinson
University of North Carolina, Charlotte

DIGITAL CAMERAS AND SPECIAL NEEDS

I ENJOYED Paul Jasper's "Choose the Perfect Camera" [July], but both the article and the camera industry have missed a category of potential customers that I suspect is quite substantial.

I've been trying to purchase a camera for my very active 77-year-old mother. She has arthritis in her hands, and I have ▶

TELL US WHAT YOU THINK

RATE THIS ISSUE by going to www.pcworld.com/pcwinput—you could win a $500 gift certificate from Amazon.com. You'll need to provide the subscriber number from your mailing label to take this survey online. The site explains the official rules and also describes how you can participate in the drawing if you're not a *PC World* subscriber.

PHOTOGRAPH: RICK RIZNER

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not yet found a model with buttons large enough for her to manipulate. A friend's mother has a mild case of Parkinson's disease; she can't maneuver the USB/FireWire plugs into the small receptacles and even has a hard time inserting memory cards. A short list of cameras for such people would have been useful.

I.E. (Skip) Hills, via the Internet

TECHNO-SNOBBERY

REGARDING Steve Fox's July *Plugged In* column, is this man still waiting for his personal jet pack to show up? You know, the one that people in the fifties said everyone would have by now.

His statement that, because of the new broadband Internet video services, "TV as we know it is dead. The networks just don't know it yet" is techno-snobbery—embracing the best without regard for the rest—at its worst. This man needs a lot more reality in his life.

Steve Coats, via the Internet

PC World *welcomes letters to the editor. We reserve the right to edit for length and clarity. Send e-mail to letters@pcworld.com.* ■

CORRECTIONS

THE AUGUST *New Products* review of Corel WordPerfect Office 12 Small Business Edition should have listed the price as $349, with upgrades (from recent versions of Microsoft Office or WordPerfect) costing $179.

In July's "The 100 Best Products of 2005," the caption for the photo of the Mitsubishi LT-3050 LCD TV on page 98 should have said that the unit is an HDTV monitor, meaning that it can display an HDTV signal from an external source but that it does not have HDTV reception capability built in.

In July's "Choose the Perfect Camera," we should have said that the Nikon D70 can record images simultaneously in both JPEG and RAW formats.

July's *Top 10 Monitors* should have said that while the speakers for the HP F1905 can connect to a subwoofer, that component is not an option with this product.

PC World regrets the errors.

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CONSUMER WATCH

ANNE KANDRA

HOW TO BUY AND SELL PC GOODS ON EBAY

PRIVACY WATCH: SITE GIVES PERSONAL INFO

ON YOUR SIDE: VOICE-OVER-IP SERVICE SNAG

Use Auctions to Save Money on Tech Gear

EBay can be a great place to find a bargain—or a buyer. Here's how to play.

CAMY RUGGIERO, based in Providence, Rhode Island, is an avid buyer and seller on EBay.

CAMY RUGGIERO DEPENDS on EBay to feed her technology addiction. The Providence, Rhode Island, resident and computer enthusiast buys and sells tech gear frequently. "I keep finding great deals on EBay for software and hardware that would cost me close to double if I bought the products elsewhere," she says.

On top of her technology transactions, Ruggiero contributes regularly to many of the site's discussion boards, such as the Computer, Networking and I.T. Discussion Board (find.pcworld.com/48736).

Things weren't always so rosy for Ruggiero, however. The first few times that she used EBay to buy tech gear, she got burned: She won an auction for what proved to be a pirated copy of Microsoft FrontPage; then a Palm V PDA arrived DOA; and after a third win, the seller balked at sending her a Palm PDA she had paid for through an escrow service.

Though Ruggiero was stuck with the software, she got a refund for the first Palm unit and canceled the escrow payment for the second. Undeterred by these experiences, Ruggiero resolved to make the auction site work for her. She did some research on EBay's site, talked to other members about how to spot potential scams, and hasn't looked back since. (According to EBay, most transactions are trouble-free. Company spokesperson Jamie Patricio says less than 1 percent of the site's transactions are fraudulent.)

If you're a tech-toy junkie like Ruggiero, you know how pricey the habit can be. EBay can be a great way to get your fix without draining your bank account—you can sell last year's MP3 player, for example, while potentially getting a great deal on a newer replacement.

Of course, you'll want to get a high price for the stuff you're selling—or a bargain if you're the shopper. So here are a few rules for participating successfully and safely on EBay. (Some of these tips cover transactions specific to tech products; others apply to any type of listing.)

TIPS FOR BUYERS

WHAT CAN BE better than getting a good deal on a cool gadget you want? Here's how to make the most out of your bids.

Shop around: Before you bid on that new laser printer, do some comparison shopping to make sure the price is right. Check the selling price on the same or similar models being offered on EBay and at other sites, as well as in retail stores. The better sense you have of an item's value, the easier it will be to steer clear of last-minute bidding frenzies.

The high score wins: It seems obvious, but favoring sellers who have high feedback scores is usually best. Read other buyers' comments, which provide much more insight than the numbers alone.

Get the facts: Don't assume that what you *think* should be included actually is. If you won't even consider a monitor ▶

ILLUSTRATION: WEBB CHAPPELL

without a DVI port, say, read the description carefully. Not sure? Ask the seller.

Warranty or no warranty? Often, warranties for computers and other tech gear are nontransferable, which means that the almost-new scanner you picked up for a song might not turn out to be such a great deal after all. Some sellers purchase third-party warranties for the items they sell. So if the listing cites a warranty, ask the seller for details about the coverage.

Do a background check: If that digital camera you're eyeing spent its youth documenting volcanic activity at close range, wouldn't you want to know that? Before you buy any second-hand item, get some information on its history.

Many happy returns? Don't buy a tech product unless you know whether you can return it. Does the seller have an explicit return policy? If not, ask.

Ship sensibly: Don't close the deal until you know how much shipping will cost. Most sellers include such charges on their listings. If the fees aren't mentioned, avoid unpleasant surprises by asking first. (And while you're there, keep an eye out for sellers who openly charge unreasonable shipping fees.) For superheavy items, like large-screen TVs, buying locally makes more sense. If you want to insure the item, work out the terms with the seller.

Protect your payment: Ready to fork over your cash? PayPal, which EBay owns, is the standard payment option for EBay users. Though it isn't without its share of glitches—see last February's "The Problem With PayPal" (find.pcworld.com/48458), for example—PayPal is one safe way to complete a transaction. Avoid sellers who try to convince you to complete the transaction off Ebay—the site prohibits this, so make sure you report such efforts to the company. Plus, stay away from sellers who ask you to wire cash directly. Finally, consider using an EBay-approved escrow service, such as Escrow.com, for purchases over $500 or so.

> EBay is a great place to grab a good deal—or unload your old gear.

TIPS FOR SELLERS

NATURALLY, YOU want to get a sky-high price for the gear you're selling. Here are some guidelines for smooth sales.

Be a pack rat: Think of your buyer. He or she will want everything to be included: cables, software and registration keys, manuals, setup poster, batteries, even original packaging—as if the item were brand new. So the next time you set up a new PC, for instance, keep everything in case you might want to sell it some day.

Compare similar items: Check out listings for the same or similar items to see how they're doing—before you list. To see completed listings, click *Advanced Search* from any listing page, select *Completed Listings Only*, and enter the product or category you're interested in.

Choose keywords carefully: Use brand and model names and numbers when you write the title for your item listing.

Be descriptive and honest: Sure, omitting the fact that the <Shift> key on your laptop's keyboard sticks is tempting. But resist the temptation and fess up. If you are selling a PC and would like to provide configuration details, give the PC ▶

PRIVACY WATCH

Online Service Provides Easy Access to Your Private Data

TWO YEARS AGO, I wrote about the privacy threat posed by local governments posting online public documents that include personal data (see find.pcworld.com/48737). This practice allowed anyone to get your address, unlisted phone number, Social Security number, and other sensitive data. At that time, anyone who wanted your details would have to know what county (or counties) held information about you and search through deeds, marriage licenses, and other documents for the juicy tidbits. Now a new Web service has made finding public-records data as easy as typing a name.

Zabasearch.com lets anyone search for information about U.S. residents. The site will give you any available street address and phone number for free. While address and phone number searching isn't new, the site can dredge up phone numbers and addresses of people who are otherwise unlisted in any other phone directory.

Additional fees, which start at $20, get you what the company calls a background check—everything that it can find about the person you specify. Online background checks aren't new, either. But many companies that perform them say they provide data only to qualified clients—potential employers, insurers, and landlords, for instance. Zabasearch will sell data to anyone who is willing to pay.

The company doesn't make it easy to remove personal info from its site. You have to send Zabasearch a snail-mail letter requesting the removal of your records. It takes two days for your details to disappear; and even then, if Zabasearch spiders find new records about you from a different source, the company can't promise that your personal details won't show up in future searches.

Though the risks to your privacy are serious, they aren't Zabasearch's fault. The larger problem is that local and state governments have been publishing public records online for years. If you're concerned about your privacy, you should, for now, send a letter to Zabasearch. But the most effective way to protect your data in the future may be to send a message to your elected representatives urging them to limit the amount of confidential information contained in public documents posted online.

—Andrew Brandt

ILLUSTRATION: MARK MATCHO

JACKPOT

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ON YOUR SIDE

Net Phone Service Abruptly Halted

I USE BROADVOICE as my Voice-over-IP service. One day I got a call from someone I know who uses Skype. While I was on the call, I got an e-mail message from BroadVoice telling me that my credit card information may have been stolen. BroadVoice then turned off my service, preventing me from making outbound calls. What's going on?

John R. Bivens, Dallas

On Your Side responds: BroadVoice reports that it has a mechanism in place to turn service off when it identifies incoming calls from numbers associated with potentially fraudulent activity. It says that fraudulent calling-card firms have seized some BroadVoice accounts, taking inbound calls and using them to redial to other outbound numbers. In Bivens's case, the call from Skype displayed bogus caller ID info. BroadVoice interrupted Bivens's outbound service to protect his account info, which was not stolen. Using his landline phone, Bivens called a number provided by BroadVoice to reactivate his service. Bivens says that he has not had any trouble with Skype calls since then.

—Aoife M. McEvoy

World PC Profiler utility a try; you'll find it on EBay at find.pcworld.com/48296.

Get visual: Take lots of photos and show the product from all angles. Include photos of the flaws you describe, too. The more info you provide, the less time you'll spend responding to e-mail queries.

Timing is everything: Find out when the next version of your product will appear. For example, if you want to upgrade your cell phone, listing last year's model before the latest edition hits the streets will probably yield a better price.

Can't sell? Recycle: EBay's Rethink Initiative (rethink.ebay.com) can help you locate resources for selling, donating, or recycling your unwanted computers, cell phones, and other electronic devices.

Next time your eye starts wandering toward the latest MP3 player, go to EBay. If you play your cards right, you might grab a great deal—especially if you can unload your old gear while you're at it. ■

Anne Kandra is a contributing editor, Andrew Brandt is a senior associate editor, and Aoife M. McEvoy is a contributing editor for PC World. *E-mail them at consumerwatch@pcworld.com, privacywatch@pcworld.com, or onyourside@pcworld.com. To read previously published* Consumer Watch, Privacy Watch, *or* On Your Side *columns, visit find.pcworld.com/31703, find.pcworld.com/31706, or find.pcworld.com/31709, respectively.*

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HASSLE-FREE PC

STEVE BASS

Four Tips to Make IE More Secure

Add a layer of protection against spyware and other malicious code.

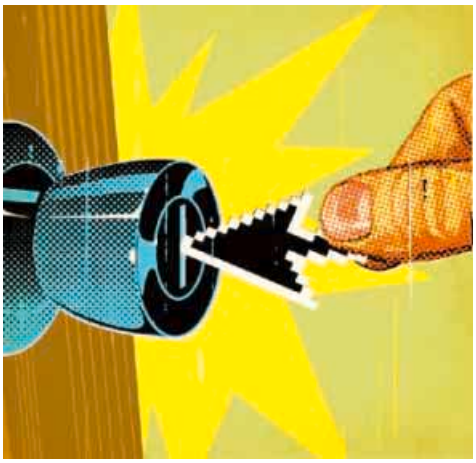
DO YOU SUFFER from *browseritis insecurius* (a fear of browser security leaks)? Instead of switching to something unfamiliar like Firefox or Opera, beef up Internet Explorer with my tips and tools.

The Hassle: *I have an anti-spyware program running, but when I went to a funny video site, a suspicious pop-up appeared. What else can I do to protect myself without spending more money?*

The Fix: You could turn off your PC and dig out your old typewriter. Nope, I didn't think you'd buy that. Using an anti-spyware program is obviously a must; I use Sunbelt's $20 CounterSpy, a PC World Class winner (a trial version is available at find.pcworld.com/46684). But adding a layer or two of unobtrusive security makes sense. Here are three tricks I rely on.

First, I use a widely misunderstood IE feature—the "Restricted sites" zone. Adding a site to this zone raises the browser's security settings. (Check it out in IE by clicking *Tools•Internet Options•Security*.) If you add a Web site to the "Restricted sites" zone, IE disables ActiveX, scripting, and Java applets for that site. That way, if you head to a page on the specified site, you'll be protected from, say, an attempted drive-by spyware attack.

But manually adding sites to the Restricted zone is a huge pain. JavaCool's free SpywareBlaster automatically adds a lengthy list of dangerous addresses to IE's Restricted sites. SpywareBlaster is compatible with AOL's browser; it also works with current versions of the Netscape, Firefox, and Mozilla browsers. Its most recent iteration is SpywareBlaster 3.4 (available at find.pcworld.com/48588).



Next, grab a copy of Globi's Klik Safe (find.pcworld.com/48370), a free Internet Explorer add-on. When you are browsing in unfamiliar territory at a spot that may not be on SpywareBlaster's list yet, use Klik Safe for protection. The tool enables you to switch IE's security settings immediately from medium to high (saving you a bunch of manual steps) to protect you from ActiveX and JavaScript threats. And when you travel to a site that you're certain is safe—for instance, Microsoft's Update page—use Klik Safe to add the site to Internet Explorer's Trusted Zone and thereby ensure that ActiveX works correctly.

SAFETY-FIRST FILE VIEWING

The Hassle: *It seems like every day I read about a brand-new virus. I'm getting worried and have stopped opening zipped files and images. Am I too paranoid?*

The Fix: What Freud said about his cigar holds true here: Sometimes an image is just an image. But it's wise to be suspicious. Even if you update your antivirus program regularly, Trojan horses and viruses embedded in images can sneak through. Novatix's RedWall file-viewing utility guards against threats even if your antivirus software isn't updated. RedWall lets you view files in a quarantined, no-risk state. It integrates with Internet Explorer, Outlook, and Outlook Express, and it works with Eudora and most other e-mail applications. No doubt RedWall is a little pricey at $50. But it can view approximately 200 file types, including Office documents, image files, and even videos. You can download a trial version at find.pcworld.com/48596. ■

Contributing Editor Steve Bass is the author of PC Annoyances, *published by O'Reilly (see find.pcworld.com/43818). Contact him at hasslefreepc@pcworld.com.*

TOOL OF THE MONTH

Internet Explorer to the Max

WHEN I OPEN IE, the silly thing may open full-screen, minimized, or as a postage-stamp-size window. Here's how to stop this dopey behavior. Open IE, hold down the <Shift> key, and click a link. A new IE window will open. Set the position and size of the new window, but don't maximize it. Now switch back to the first IE window, close it, and close the second IE window. If IE still won't behave, use IE New Window Maximizer; this free utility makes new IE windows open maximized, uses a hot key to hide and close IE windows, and closes pop-up windows. Get it at find.pcworld.com/48598.

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BUGS & FIXES

STUART J. JOHNSTON

Windows, IE at Risk From PC Snatchers

Here's how to block security attacks in Internet Explorer and Windows Help.

LAST NIGHT I watched an old Stephen King sci-fi thriller called *Maximum Overdrive*. It was very campy and very bad. The premise: A cometary radiation storm causes all machines—from Mack trucks to the milk-shake maker at the local diner—to come alive and rebel against humans. In the digital universe, PCs are vulnerable to their own kind of external threat: worms designed by hackers to deliberately turn your system against you. Your protection: Patch, patch, and patch your PC.

Microsoft has released critical patches for newly discovered vulnerabilities in Internet Explorer and Windows. One hole involves the way that IE displays Portable Network Graphics files and affects IE 5.01 through 6 Service Pack 1 running on Windows 98 through XP Service Pack 2. (Although PNG is not a widely used graphics file format on the Web, it could be used to launch an attack program.) Things might appear fine in IE—no pop-up errors and no problems viewing sites—until your PC starts deleting files and doing other things, seemingly on its own.

To trigger an attack, you would have to click a link that leads to a cracker's Web site or open an HTML e-mail message that contains a flawed PNG file; these actions allow the attacker's site to send IE too much data at once, creating a buffer overflow error. That leaves a hole in your system through which a damaging program could enter. So avoid the risk by getting the patch at find.pcworld.com/48776.

WINDOWS HELP FILES GONE AWRY

MICROSOFT HAS fixed a glitch in how Windows processes files in the HTML Help system. You don't have to launch a Help file to set off an attack; the malicious code will do it for you. The trigger could be disguised as a bogus banner ad, for example, or a booby-trapped button. The point is to get you to click a link that uses the Help exploit to break into Windows.

A successful assault would let an attack program wreak havoc on a PC. Systems running Windows 98 through XP SP2 are vulnerable. Download the fix at find.pcworld.com/48777. Fortunately, this and the PNG hole apparently have not yet spawned an attack on anyone's machine. ■

Stuart J. Johnston is a contributing editor for PC World. *Visit find.pcworld.com/31580 to see more* Bugs and Fixes *columns.*

SECURITY ADVISORIES BEGIN TO PAY OFF

MICROSOFT'S PILOT EARLY-WARNING service, called Security Advisories (go to find.pcworld.com/48340 to subscribe), has released an important alert and an update. First, Microsoft warned about, and 12 days later patched, a hole in IE that could cause the browser to crash, letting culprits break in. (There have already been attacks, according to the company.) So protect your computer and download the patch at find.pcworld.com/48780.

In the advisory, Microsoft also issued Update Rollup 1 for Windows 2000 Service Pack 4 (posted at find.pcworld.com/48852), containing patches released between June 2003 and April 2005.

IN BRIEF

Hole in Adobe Apps

IF YOU USE Adobe Creative Suite 1, Photoshop CS, or Premiere Pro 1.5, and you unintentionally disable your firewall (for example, by accidentally unchecking a box in your network configuration settings), you could be hit by a cyberassault. The problem lies in the app's license management technology. The programs will continue to work; but without the updated license mechanism, your PC is at risk. Bad guys prowling for an unpatched system could slide into yours through this hole. Locate the update at find.pcworld.com/48778.

Opera Fixes Flaw

A HOLE in Opera 7.*x* and 8 could let a cracker launch a pop-up that looks as if it is from a site you're visiting, when in fact it's from the hijacker's site. If you enter the data it asks for (such as a credit card number), you could fall victim to a phishing scam. Get version 8.01 at find.pcworld.com/48902.

BUGGED?

FOUND A hardware or software bug? Tell us about it via e-mail at bugs@pcworld.com.

ILLUSTRATION: JAMES O'BRIEN

NEW PRODUCTS

EDITED BY LIANE CASSAVOY AND MELISSA J. PERENSON

Top-of-the-Line Tablets

Lenovo's first tablet PC and Motion Computing's slate deliver solid performance, sans the bulk.

LENOVO'S CONVERTIBLE ThinkPad X41 Tablet (left) and Motion Computing's LE1600 Tablet PC slate.

PHOTOGRAPHS: MARC SIMON

TABLET PCs

GOOD NEWS FOR ThinkPad fans: You can now have your notebook and your tablet PC, too. Lenovo's $2059 **ThinkPad X41 Tablet**, the company's first portable based on Windows XP Tablet PC Edition, is a svelte convertible that fully lives up to ThinkPad's proud design heritage. The X41 and Motion Computing's new $2439 **LE1600 Tablet PC** are among the first tablets to use Intel's latest mobile technology to stay slim without sacrificing much performance.

The two tablets are similar in many ways. Both carry Intel's 1.5-GHz Pentium M LV 758 processor, one of the centerpieces of Intel's next-generation mobile platform, code-named Sonoma; both run Windows XP Tablet PC Edition 2005, the latest version of the tablet operating system; and both have fingerprint scanners with biometric security software and 12.1-inch active-matrix LCD digitizer screens. Each model also features built-in 802.11g Wi-Fi and a full complement of connectors (two USB 2.0 ports, ethernet and phone jacks, and SD and PC Card slots).

Beyond these similarities, Motion Computing's preproduction LE1600 Tablet PC edged out our shipping ThinkPad X41 Tablet in most respects. However, the ThinkPad left the LE1600 in the dust in our battery life tests: It ran for a solid 5 hours, 1 minute, considerably outdoing the LE1600's time of 3 hours, 3 minutes. (Our tests were performed without the optional extended-life batteries.)

TABLETS WITH SPEED

OUR LE1600 SHIPPED with 768MB of RAM and a 60GB hard disk, compared with the ThinkPad's 512MB of memory and 40GB hard drive. The LE1600's extra RAM might have helped it squeeze by the ThinkPad in our WorldBench 5 test suite: The LE1600 Tablet PC earned a score of 60, while the ThinkPad X41 Tablet scored 58—a difference you probably wouldn't detect in most business applications.

The design of the Pentium M LV 758 processor contributes mightily to these tablets'

LE1600 Tablet PC

Motion Computing

Preproduction model, not rated

Exceptionally lightweight tablet's heavy-duty security features and accessories hit the mark for well-heeled corporate travelers.

Street: $2439

find.pcworld.com/48790

ThinkPad X41 Tablet

Lenovo

★★★★☆

ThinkPad takes the Tablet PC plunge in style, providing great battery life without a significant price premium.

Street: $2059

find.pcworld.com/48789

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lower travel weight. In this regard, Motion goes further than does Lenovo: The LE1600 boasts an impressive travel weight (including AC adapter) of just 3.2 pounds, compared with 4.2 pounds for the ThinkPad. (But paired with its optional, $170 convertible keyboard, the LE1600 matches the ThinkPad's weight.)

PORTABLE COMMONALITIES

THE THINKPAD X41 Tablet is in many respects similar to the standard, nontablet ThinkPad X41, and can use the same extended battery and docking station. As with most ThinkPads, the keyboard is a joy to type on—responsive and firm. Swiveling and locking down the display to turn the notebook into a slate was exceptionally easy, although the X41's sloping profile in tablet mode (it's thicker at the hinge than at the edge) occasionally made the machine disconcerting to hold. I also liked the easy-to-use fingerprint scanner software; after a couple of false starts due to inept finger swipes, I enrolled my right index finger and thumb in a matter of minutes.

The LE1600 Tablet PC, meanwhile, is slightly lighter and thinner than Motion's previous corporate-focused slates. A welcome new option is the aforementioned convertible keyboard, a compact all-in-one peripheral that includes a minidock and charging station, and lets you prop up your tablet when typing. Also new: hot-swappable dual batteries, including an exceptionally skinny lithium polymer extended battery (a $230 option); a DVI-D port for connecting to digital displays; and the ability to switch between two of the three built-in microphones, depending on whether the unit is in landscape or portrait mode.

Motion's updated Dashboard utility provides quick access to critical settings such as display orientation, sound volume, and Wi-Fi security. The LE1600's beefed-up Security Center links to all features related to security, including Microsoft's own Security Center, an Infineon Trusted Platform Module (a security hardware and software combo aimed at ultra-security-focused enterprise customers), and Motion's OmniPass password application and Fingerprint Reader.

At $2059—including an auxiliary eight-cell battery but not including a $199 USB 2.0 CD-RW and DVD-ROM combo drive—the ThinkPad X41 Tablet is within $160 of a comparably configured conventional ThinkPad X41 notebook. Motion Computing's tablet is a more expensive proposition: As configured, our $2439 LE1600 doesn't include a keyboard, desktop stand/docking station ($260), or USB 2.0 CD-RW and DVD-ROM combo drive ($200).

Security-conscious corporate and individual users may be willing to pay top dollar for the LE1600 Tablet PC's security extras and light weight. The more affordable ThinkPad X41 Tablet, however, is far more likely to make at least some mainstream users revisit the tablet option.

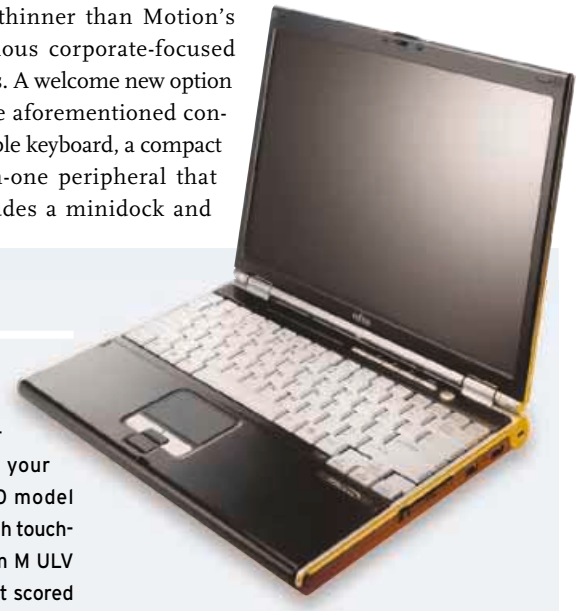
—Yardena Arar

QUICK TAKE

Fujitsu's Touchy Notebook

IF YOU'RE LOOKING for a touch-screen notebook—and want something a bit lighter than the Lenovo tablet above—Fujitsu's LifeBook B6000D could suit your needs. This sturdily designed, $1700 model weighs just 3.4 pounds and has a 12.1-inch touch-screen display, a 1.2-GHz Intel Pentium M ULV 753 processor, and 802.11a/g wireless. It scored 61 on our WorldBench 5 tests, barely edging the tablets reviewed above, and it's a bit thin on some specs (it has only a 40GB hard drive and no built-in optical drive). But I found its touch screen a convenient and smooth alternative to a touchpad or pointing stick—especially when using the B6000D on the go. find.pcworld.com/48872

—Melissa J. Perenson



FUJITSU'S LifeBook B6000D has a touch screen.

Nikon's SLR for the Masses

DIGITAL CAMERA

NIKON'S 6.1-MEGAPIXEL **D50** digital SLR model is no photographic marvel, but it does fit nicely into the latest digital camera trend: making interchangeable-lens photography accessible to shooters who don't have deep pockets.

If you already have Nikon lenses from a film camera, you can use them with a D50 body, which sells for $750. Nikon also sells the D50 with an 18mm–55mm zoom lens for $900, a price a bit less than that of the D50's direct rival, Canon's 8-megapixel Digital Rebel XT, and about $400 less than the Nikon D70s.

The choice between the D50 and the 6.1-megapixel D70s is an interesting dilemma. (For more info on the Digital Rebel XT, the D70s, and other digital SLRs, see "Powerful Cameras, Lower Prices" on page 128.) The two Nikons are near twins in look (both have 2-inch LCDs), function, and megapixel count. The D50 is a bit smaller and lighter, though, and it accepts SD (Secure Digital) media cards exclusively (the D70s accepts CompactFlash).

The D50 also lacks some controls as compared with the D70s. You'll still get most of what a hobbyist photographer might look for, though, and intermediate photographers should find the D50 easier to use than the D70s.

A surprising difference between the two models: Shooting in automatic mode, our shipping D50's images were brighter and had livelier color. According to Nikon, this is by design: The D70s is biased toward underexposure by default, while the D50 is tuned for those photographers who want to minimize the time they spend tweaking their shots on a computer.

The D50 is a fine entry-level digital SLR—particularly if you own some Nikon lenses. Some may even prefer it to Canon's popular Rebel XT.

—*Tracey Capen*

NIKON'S D50 is noticeably smaller and lighter than its pricier sibling, the D70s.

D50
Nikon
★★★★☆
SLR speed and flexibility, along with an affordable price, make Nikon's least-expensive interchangeable-lens digital camera an enticing package.
Street: $750 (body only), $900 (with lens)
find.pcworld.com/48788

Take Your TV Anywhere

STREAMING MEDIA

HAVE A CRAVING to watch TV in the office? You may not be able to set up a television in your cube, but you can watch your home TV over the Internet with Sling Media's $250 **Slingbox Personal Broadcaster**.

This slim silver box connects to your home network and allows you to change channels and watch TV or other video sources from afar. The Slingbox has composite, S-Video, and coaxial inputs (and works with cable/satellite boxes, DVD players, and digital video recorders like TiVo). It does not, however, work with high-definition video.

I installed the SlingPlayer software on my home PC to configure the unit, and again on my laptop so that I could watch video remotely. Then I attached my chosen video source. Once I entered an ID code into the SlingPlayer (so that it could locate the Slingbox over the Internet), I could access the unit remotely.

The higher the bandwidth you get across a network—be it the Internet or your home network—the better the picture will appear. I found the video and audio playback acceptable when experienced over a home network (at 700 to 800 kilobits per second). But the image had some obvious compression artifacts, and those artifacts became very pronounced when I tried to watch the video in the full-screen mode (which doesn't occupy the whole screen). The compression was much more obvious when I tried the product over a typical domestic DSL connection rated at a 300-kilobits-per-second upstream transfer speed: The video was jerky and heavily pixelated.

Although aspects of its software interface are inelegant, I nonetheless found the Slingbox nifty. It does what it sets out to do—enabling access to live TV, a DVR, or a DVD player remotely—with reasonable ease and success.

—*Richard Baguley*

THE SLAB-LIKE Slingbox lets you watch TV on the go.

Slingbox Personal Broadcaster
Sling Media
★★★½☆
The Slingbox Personal Broadcaster has its uses, but its image quality may be disappointing unless you have an ultrahigh-bandwidth connection.
Street: $250
find.pcworld.com/48792

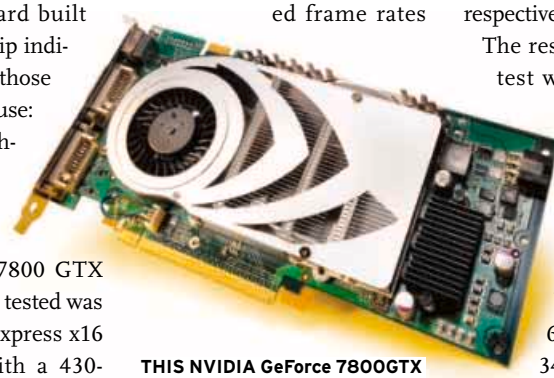
PHOTOGRAPHS: MARC SIMON

GeForce 7800 GTX Sets Speed Records

GRAPHICS CARD

PACKED WITH JUST over 300 million transistors, NVidia's latest high-end graphics chip, the **GeForce 7800 GTX**, is one of the most complex processors ever designed. And our tests of a reference board built around the new chip indicate it's putting all those transistors to good use: It's the fastest graphics board we have seen to date.

The speed-demon GeForce 7800 GTX reference board we tested was a single-slot PCI Express x16 card equipped with a 430-MHz processor, 256MB of 600-MHz DDR3 memory, and dual DVI outputs. It set new speed records in almost all of the PC World Test Center's gaming tests—an impressive feat in and of itself. In our Doom 3 test with antialiasing, the 7800 GTX posted frame rates of 65 and 42 frames per second, at resolutions of 1024 by 768 and 1600 by 1200, respectively. By contrast, a previous speed leader, ATI's $500 Radeon 850 XT Platinum Edition, managed 52 and 31 fps, respectively, in the same tests.



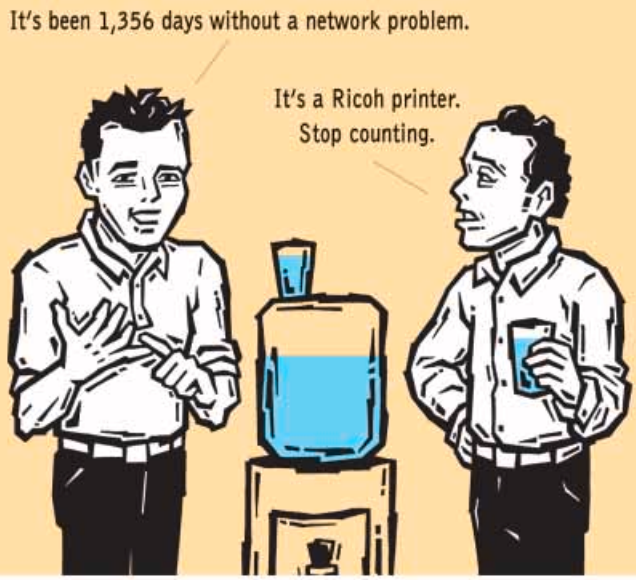
THIS NVIDIA GeForce 7800GTX reference board sped past our previous top performers.

The results of our Far Cry test were almost as dramatic. The 7800 GTX turned out 50 fps at 1600 by 1200 resolution with antialiasing on. The next-fastest board, a GeForce 6800 GT, cranked out 34 fps; ATI's 850 Platinum managed only 17 fps. Midrange graphics boards like NVidia's GeForce 6600 GT, which costs around $200, completed the same Far Cry test at about 19 fps.

NVidia partners, such as Asus and Chaintek, are selling the new card for about $600, which puts it out of the range of all but the most-well-heeled gamers. The board delivers on its speed promise, though. That NVidia managed to fit everything onto a single-slot board cooled by a reasonably quiet fan is doubly impressive.

—Eric Dahl

NVidia GeForce 7800 GTX
Preproduction model, not rated
Ultrapricey graphics board sets a speed record and delivers high performance for the megabucks.
Street: $600
find.pcworld.com/48584



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Antec's Quiet, Top-Notch PC Chassis

PC CASE

MOST DO-IT-YOURSELF PC builders spend a load on high-end components—and then unwisely skimp on the case. For those willing to spend a bit more, Antec offers its new **P180 Advanced Super Mid Tower**.

Well-crafted and sporting a unique internal design, this $159 silver-and-black chassis should satisfy even the most discerning computer builder. Antec designed the P180 to please both performance nuts and silence seekers. Wrapped in a shell of noise-dampening plastic and metal, the 31-pound case features a solid, double-hinged door that conveniently swings out of the way (a brilliant, albeit small, touch), as well as three speed-adjustable Antec TriCool chassis fans that provide plenty of low-noise cooling.

The interior has two chambers: The lower one holds the power supply and hard drives (to isolate heat and noise); the upper one holds the motherboard and additional drives.

P180 Advanced Super Mid Tower

Antec

★★★★½

Slick, quiet, and roomy design makes this pricey enclosure a system builder's dream.

List: $159

find.pcworld.com/48739

The case offers a whopping 11 drive bays, each with rubber grommets that Antec says should dampen drive noise.

The P180 doesn't include a power supply, so I installed Antec's fantastic $199 Phantom 500 in my shipping unit. The combination of the chassis, the low-noise fans, and the Phantom power supply proved supremely quiet. Unfortunately, all this hushing made the noise emanating from my stock CPU and graphics card fans that more noticeable.

The one disappointing element of the P180 is its removable Quiet Computing graphics card air duct, which seemed more adept at blocking access to the motherboard than it was at blocking noise.

Still, whether you're building a high-end system—or an extremely quiet one—Antec's P180 is a sound investment.

—*Tom Mainelli*

ANTEC'S P180 Advanced Super Mid Tower chassis offers a thoughtful, unique design.

PHOTOGRAPH: MARC SIMON

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Print Snapshots Using Your TV

PHOTO PRINTER

YOU DON'T NEED to edit and print your photos on a PC: Sony's new **DPP-FP50 Digital Photo Printer** lets you do the work on a TV. The $200 dye-sublimation snapshot printer also permits you to print your images directly from a memory card or from a PictBridge-compatible digital camera.

DPP-FP50 Digital Photo Printer

Sony Electronics

★★★☆☆

If you don't want to sit at a PC to edit and print your photos, the DPP-FP50 is appealing; but prints don't come cheap.

Street: $200

find.pcworld.com/48738

The compact DPP-FP50's small, monochrome LCD lets you select the images to print, but it doesn't allow you to preview them. I found the printer much easier to use when I plugged the supplied cable into my living-room TV set. Using the included remote, I could browse stored images and edit them on screen.

I saw plenty of sharp detail in test output from the DPP-FP50, but some prints lacked contrast and vivid colors.

The DPP-FP50 prints borderless snapshots on sheets of 4-by-6-inch or 3.5-by-5-inch paper. It comes with a starter pack containing 20 sheets and a print ribbon. You can buy a paper-and-ribbon refill pack to print 80 4-by-6 photos for $45. The per-print cost of the refill pack is 56 cents—almost double the amount you would pay with the Epson PictureMate, which had the lowest per-print cost of the four snapshot printers we tested for our April review, "Photo Printers: The Price of Great Pictures" (find.pcworld.com/48784).

THE DPP-FP50's LCD is difficult to read because it lies flat and lacks backlighting.

The DPP-FP50 is perfect for your family to gather around the TV and view slide shows of their latest adventures, printing their favorites with a few clicks of the remote. But for better picture quality at an economical price, I recommend the Epson PictureMate Deluxe Viewer Edition (find.pcworld.com/48782). That model costs $50 more, but cheaper printing costs will make up the difference after about 150 snaps.

—Paul Jasper

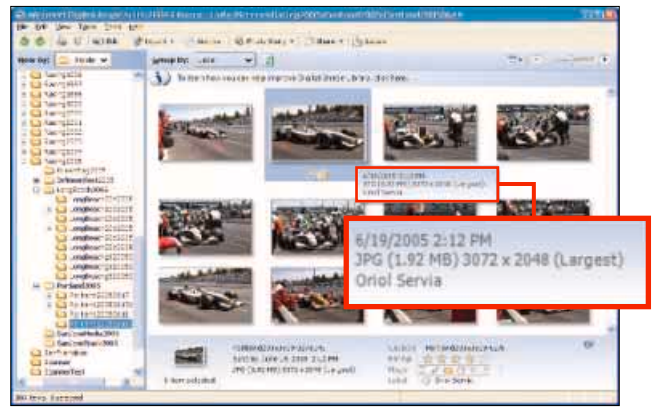
Microsoft Offers Easy Photo Management

IMAGE EDITING

ORGANIZING AND editing your ever-growing collection of digital photos can be a daunting prospect, but Microsoft's **Digital Image Suite 2006** simplifies the process. However, users of Digital Image Suite 10—the $100 package's predecessor—may notice little that is new, and no upgrade discount is available.

At the heart of the upgraded product is Digital Image Suite 2006 Library, which automatically indexes your images and allows you to use keywords and flags to categorize photos.

Digital Image Suite 2006 Editor includes a set of Auto Fix commands that enable you to make basic changes easily; even more-complex tasks require only a few steps.



DIGITAL IMAGE SUITE 2006 lets you categorize images using multiple keywords, making sorting through your collection easier.

New in the 2006 version is an Intuitive Crop function that analyzes your photo and suggests the best way to frame your subjects. It works well, and it allows you to make changes if you're not happy with the suggestion. Editor also gains support for RAW-format images captured by advanced digital cameras.

Digital Image Suite 2006 bundles Photo Story 3.1, which lets you combine photos with voice narration, background music, and transition effects to make professional-looking slide shows.

Digital Image Suite 2006 doesn't improve dramatically on the previous version, and it lacks the power and variety of such competing packages as Adobe Photoshop Elements and Corel Paint Shop Pro Studio. Still, this competent image application is well suited for photographers who are ready to step up from the basic software that came with their cameras.

—Paul Jasper

Digital Image Suite 2006

Microsoft

★★★½☆

Easy-to-use image management and editing package will please budding digital photographers, but current users have little reason to upgrade.

Street: $100

find.pcworld.com/48740

PHOTOGRAPH: MARC SIMON

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SAMSUNG

Peachtree 2006 Adds Accounting Review

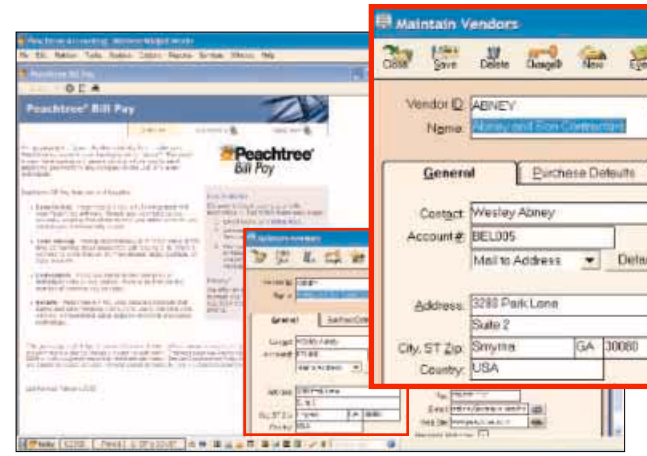
FINANCE

EVEN IF YOU'RE satisfied with your internal accounting controls, you'll appreciate the new audit tests in Sage Software's **Peachtree by Sage 2006**. I looked at three shipping versions of the new application: Premium Accounting, Complete Accounting, and the standard Accounting.

Peachtree by Sage 2006
Sage Software
★★★½☆
Good small-business accounting, with handy audit tests that make this a worthwhile upgrade.
List: Premium $500, Complete $300, standard $200
find.pcworld.com/48742

Sage, formerly Best Software, adds the new Internal Accounting Review feature in the three Peachtree editions that I tested for this review. (A fourth version, Peachtree First Accounting 2006, omits the accounting review feature, and I did not evaluate it.) The tool runs up to 15 audit tests on your accounting database to alert you to possible errors and suspicious transactions.

New in the Complete and Premium editions is Peachtree's Bill Pay service, which permits you to send electronic payments to your suppliers. Prices for the Internet-based service start at $16 per month (for 20 or fewer transactions).



PEACHTREE ACCOUNTING lets you deliver payments electronically.

Small companies that need only such basic features as financial statements, payroll, and simple inventory should be satisfied with Peachtree Accounting ($200, or $180 as an upgrade), a single-user app. Peachtree Complete Accounting ($300, or $260 as an upgrade) is multiuser-ready and adds advanced functions such as job cost, time billing, and enhanced inventory. Peachtree Premium Accounting ($500, or $400 as an upgrade) adds serialized inventory, extended three-year budgets, and more flexibility in creating financial reports.

Audit tests aren't sexy, but they could save your business plenty of headaches, making this upgrade worthwhile.

—Richard Morochove

Digital Media Player Does It All

MEDIA PLAYER

FROM ITS STYLISH black case to its bright color screen, the **Cowon IAudio X5** is a class act. Weighing under 6 ounces and measuring about 4 inches tall by 2.4 inches wide by 0.5 inches thick, this hard drive–based digital media player crams plenty of features into its relatively small package.

THE IAUDIO X5 allows you to navigate large music collections easily.

The IAudio X5 can play back audio and video, record from its built-in FM radio, and record from a line input. The unit can also copy files from other USB devices such as digital cameras without requiring a PC to act as intermediary. And at $300 for the 20GB version, the IAudio X5 is attractively priced (a 30GB version costs just $50 more).

A 1.8-inch LCD screen dominates the compact case, and a joystick underneath handles volume and menus. Play/pause and record buttons are located on the side of the device, as is the power/hold switch. The controls are a pleasure to use.

On the bottom of the X5 you'll find a port for connecting what Cowon calls the "subpack"—a small plastic dongle with ports for power, USB, line-in, and line-out. You'll need this subpack to recharge the device in a wall socket, which is a bit of a pain because the piece is small enough to get lost easily.

As an audio player, the X5 performs admirably, generating bright, clear sound. It's versatile, too: The X5 can play MP3, Ogg Vorbis, FLAC, and .wav music files. And its supported video file formats include AVI, MPEG, and WMV.

Battery life was good: I got around 13 hours of audio playback. Playing a video reduced the battery life to around 3.5 hours, but you won't want to use the screen for that long, anyway: Although the LCD delivers sharp images and bright colors, it's simply too small for extended viewing.

Nonetheless, I found the X5 to be a great little digital media player that gives you lots of features for the price.

—Richard Baguley

IAudio X5
Cowon America
★★★★☆
Well-designed digital audio and video player includes plenty of features but still carries an attractively low price.
Street: $300
find.pcworld.com/48744

PHOTOGRAPHS: MARC SIMON

Silex Offers Universal USB Access

NETWORKING

WANT TO ACCESS a USB hard drive, printer, or scanner from anywhere on your Windows network? Silex's $150 **Pricom SX-2000U2** lets you do so, giving you control of virtually any USB peripheral, with the exception of some speakers and Web cameras.

The secret: a small white box that establishes a physical bridge between your network router and the USB device, plus some clever software. The company's included SX Virtual Link utility tricks each computer into thinking that the USB device connected to the Pricom SX-2000U2 is attached directly to the PC.

THE SX-2000U2 physically links USB devices to networked PCs.

I tested the SX-2000U2 with a range of USB peripherals—including Samsung's ML-1450 printer, IRiver's MP3 player, Epson's 2480 scanner, memory keys, and various USB-based hard drives—with nary a hitch.

There's a major drawback, however: manual access and sharing. Every time you want to access a device linked to the SX-2000U2, you must manually connect to it. When you're done using the device, you then have to manually disconnect it—if you don't, no one else will be able to use it. This limitation could be bad news if, for example, a coworker happens to leave the office without remembering to disconnect a device first.

The product's price ($150) is problematic, too. If it cost half as much, I might shrug off the sharing issue. As it is, buying more peripherals or purchasing truly sharable storage for your home network may be a better strategy.

The Silex SX-2000U2 is a clever product for casual users or for IT types who may need quick access to a remote USB device, but manual sharing could be an invitation to frustration in a normal networking environment.

—Jon L. Jacobi

Pricom SX-2000U2
Silex
★★★☆☆
Pricey hardware/software combo lets you mount USB devices on your network, but manual sharing could be troublesome.
List: $150
find.pcworld.com/48746

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PGP Desktop 9 Delivers a Sweet Security Suite

SECURITY

IN AN ERA WHEN stories of stolen laptops and identity theft are commonplace, you must protect your vital data with encryption and other security measures. **PGP Desktop 9** (the PGP stands for Pretty Good Privacy) supplies most of the tools you'll need.

PGP Corporation's new $70 suite includes a file shredder, a free-space cleaner, and an array of encryption tools.

PGP Desktop 9 makes encrypting e-mail messages far easier than its predecessors did. No plug-ins are necessary. You simply compose your message in your e-mail application (any client that supports the POP3, SMTP, IMAP, or MAPI protocols). The software automatically detects and encrypts the outgoing message. (If the recipient doesn't have PGP Desktop installed, you can opt to send the message unencrypted.)

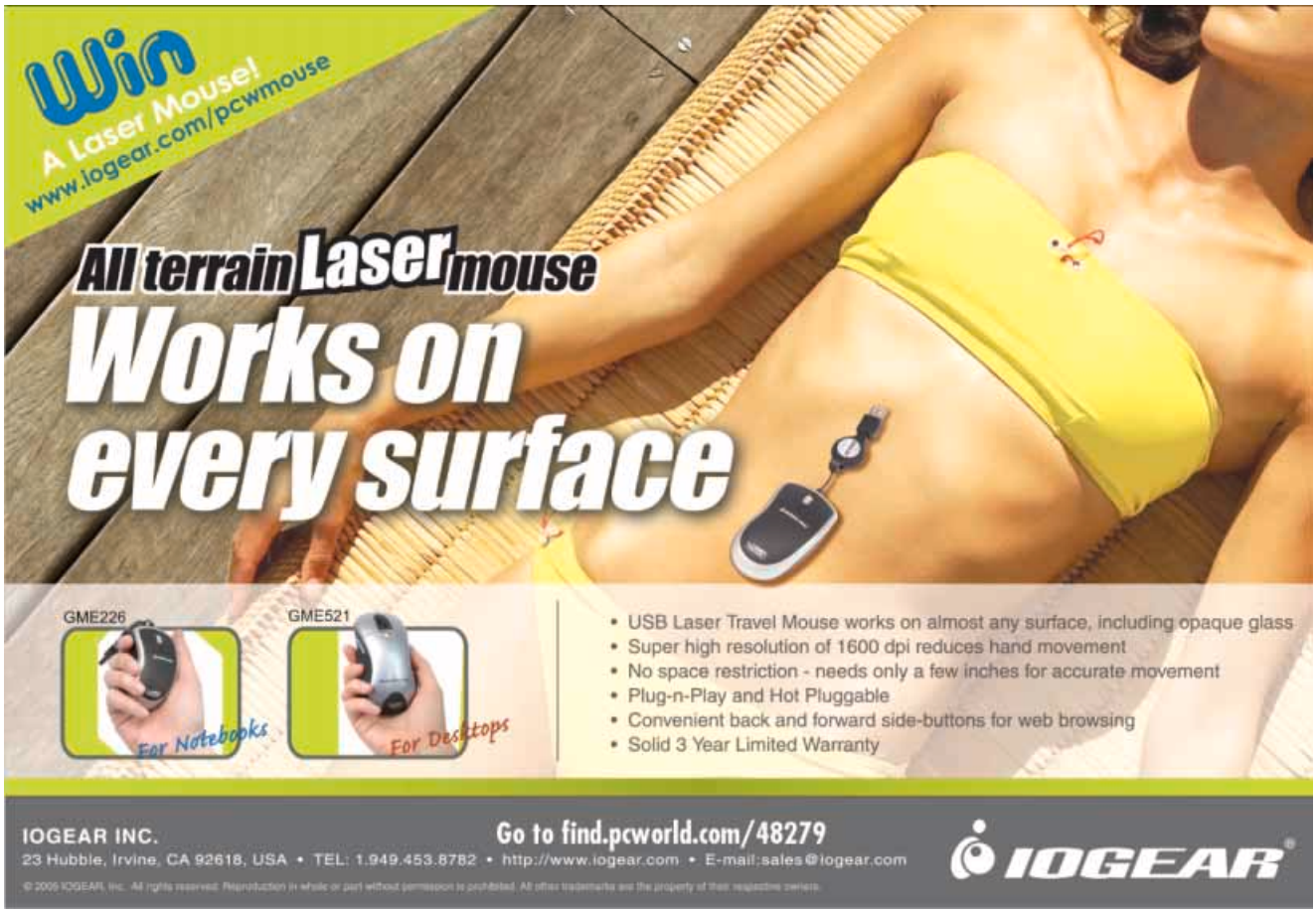
PGP Desktop 9
PGP Corporation
★★★½☆
Protects your sensitive data by offering strong encryption, at a reasonable price.
List: $70 annual subscription (includes access to the software), $199 perpetual license
find.pcworld.com/48747

PGP DESKTOP'S busy interface can make finding features difficult.

This PGP Desktop also introduces protection for your instant messages. It can act as a proxy for AOL Instant Messenger, establishing a channel for encrypted communications between two PGP Desktop users. As long as both have PGP Desktop 9 running, the encryption occurs invisibly in the background.

The app suffers from a busy interface. But if you keep vital info on your laptop or desktop PC, you'll benefit from the rich set of useful file security tools in PGP Desktop 9. ■

—Andrew Brandt



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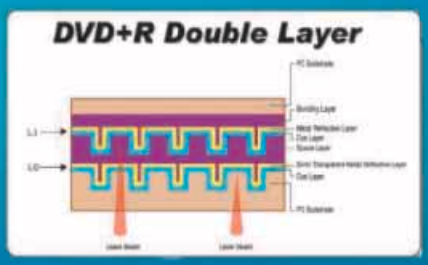

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ThinkPad recommends Microsoft® Windows® XP Professional.

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MOBILE TECHNOLOGY

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ThinkPad R50e

DISTINCTIVE INNOVATIONS
Rescue and Recovery – one button recovery and restore solution

SYSTEM FEATURES
Intel® Centrino™ Mobile Technology
Intel® Pentium® M Processor 725 (1.60GHz)[1]
Intel® PRO/Wireless 2200BG (802.11b/g)[2]

Microsoft® Windows® XP Professional[3]

15" XGA TFT Display (1024x768)

256MB DDR SDRAM[4], 40GB Hard Drive[5]

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$99 (P/N 10K0209)

ThinkPad X40

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DISTINCTIVE INNOVATIONS
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SYSTEM FEATURES
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ThinkPad recommends Microsoft® Windows® XP Professional.

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ThinkPad X40

ThinkPad R50e

ThinkPad R52

Mainstream performance and features.

SYSTEM FEATURES

Intel® Centrino™ Mobile Technology
Intel® Pentium® M Processor 740 (1.73GHz)
Intel® PRO/Wireless 2200BG (802.11b/g)

Microsoft® Windows® XP Professional

15" XGA TFT Display (1024x768)

256MB DDR SDRAM

40GB Hard Drive

CD-RW/DVD-ROM Combo

1-yr limited warranty[11]

THINK EXPRESS MODEL

$1049 (P/N 1842QEU)

ThinkPad T43 with Integrated Fingerprint Reader

Perfect balance of performance and portability.

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Embedded Security Subsystem 2.0 – Strong security as a standard feature

SYSTEM FEATURES

Intel® Centrino™ Mobile Technology
Intel® Pentium® M Processor 750 (1.86GHz)
Intel® PRO/Wireless 2915ABG (802.11a/b/g)

Microsoft® Windows® XP Professional

14.1" SXGA + TFT Display (1400x1050)

512MB DDR SDRAM

60GB Hard Drive, Ultrabay Slim Multi-burner Plus

Only 1" thin and 4.7-lb. travel weight

3-yr system/1-yr battery limited warranty[11]

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$1949 (P/N 2687D3U)

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Mainstream performance and features.

SYSTEM FEATURES

Intel® Celeron® M Processor 360 (1.40GHz)

Microsoft® Windows® XP Home Edition

14.1" XGA TFT Display (1024x768)

128MB DDR SDRAM

40GB Hard Drive

CD-ROM

1-yr limited warranty[11]

THINK EXPRESS MODEL

$699 (P/N 1834E2U)

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DISTINCTIVE INNOVATIONS

Embedded Security Subsystem 2.0 – Strong security as a standard feature

SYSTEM FEATURES

Intel® Centrino™ Mobile Technology
Intel® Pentium® M Processor 725 (1.60GHz)
Intel® PRO/Wireless 2200BG (802.11b/g)

Microsoft® Windows® XP Professional

256MB DDR SDRAM, 40GB Hard Drive

Only 1" thin[7] and 4.5-lb travel weight[8]

THINK EXPRESS MODEL

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ThinkPad Nylon Carrying Case

Inside you'll find SafePORT® Air Cushion Protection which adjusts to cradle X, T, R or G Series notebook computers.

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ThinkPad T43

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MOBILE TECHNOLOGY

ThinkCentre A50
(monitor not included)

ThinkCentre A50

Sleek tower design.

SYSTEM FEATURES

Intel® Celeron® D 330 (2.66GHz)
Microsoft® Windows® XP Professional
256MB DDR memory at 333MHz
40GB Hard Drive, CD-ROM
6 USB 2.0 Ports (2 frontside)
1-yr limited warranty with limited onsite service[12]

THINK EXPRESS MODEL

$499 (P/N 8148D3U)

ThinkCentre A51

PCI Express technology.

SYSTEM FEATURES

Intel® Pentium® 4 Processor 515 (2.93GHz)
Microsoft® Windows® XP Professional
256MB DDR2 memory at 400MHz
40GB Hard Drive, CD-ROM
8 USB 2.0 Ports (2 frontside)
1-yr limited warranty with limited onsite service[12]

THINK EXPRESS MODEL

$599 (P/N 813116U)

E400 Projector

Small and feature-rich, the E400 is a cost-effective solution for your business and entertainment needs featuring DLP technology.

$999 (P/N 0038A04)

ThinkCentre A50

Ultra small form factor.

SYSTEM FEATURES

Intel® Pentium® 4 Processor 530 with HT Technology (3GHz)
Microsoft® Windows® XP Professional
256MB DDR memory at 400MHz
40GB Hard Drive, CD-ROM
6 USB 2.0 Ports (2 frontside)
1-yr limited warranty with limited onsite service[12]

THINK EXPRESS MODEL

$649 (P/N 809021U)

19" ThinkVision L190 Flat Panel Monitor

With an ultra-narrow 15-millimeter monitor bezel, this monitor is ideal for use in multi-monitor environments.

$399 (P/N 9329AB9)

ThinkCentre A50
(monitor not included)

ThinkCentre A51
(monitor not included)

ThinkCentre A51

PCI Express technology.

SYSTEM FEATURES

Intel® Pentium® 4 Processor 530 (3GHz)
Microsoft® Windows® XP Professional
512MB DDR2 memory at 400MHz
80GB Hard Drive, CD-RW Drive
8 USB 2.0 Ports (2 frontside)
1-yr limited warranty with limited onsite service[12]

THINK EXPRESS MODEL

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Wipe Out Windows Annoyances

Banish the worst glitches, time-wasters, and irritations in the world's most popular operating system with these 29 tips. Plus: Get the scoop on Windows' biggest rivals.

BY SCOTT SPANBAUER

WINDOWS XP MAY BE more stable and secure than its predecessors (which, let's face it, isn't saying much), but it is just as annoying. If you spend your days with XP, you'll run into many idiotic little things that need fixing, from poky startups to icons playing hide-and-seek. Some problems lack a good solution—though I'll offer a workaround—and land on my wish list for the next Windows version. But nirvana is in sight: I'll show how to fix many XP foibles to bring your computing experience closer to heaven. If you're fed up with Windows, check out "The Truth About Windows Alternatives" on page 75 to get the lowdown on Mac and Linux. ▶

WINDOWS ANNOYANCES

64 Essential Anti-Annoyance Add-Ons

66 64-Bit Windows Is Here—Without the Benefits

WINDOWS ALTERNATIVES

76 Xandros OS v3 Deluxe

80 Mac OS X 10.4 (Tiger)

ILLUSTRATIONS BY HAL MAYFORTH

System Snafus

Speed Up the Windows Boot

THE ANNOYANCE: I installed some new applications on my system, and now Windows blithely lets them load automatically every time Windows boots, slowing my speedy startup to a crawl. Adding insult to injury, the new apps don't offer any way to disable this automatic launching.

THE FIX: If you can't find a program's startup configuration settings (perhaps because they don't exist), use Windows' System Configuration Utility to block program startup manually. Choose *Start•Run,* enter **msconfig** in the 'Open' text box, and click *OK*. Select the *Startup* tab, uncheck one or more of the items listed (for clarity, try disabling just one item at a time), click *OK,* and then click *Restart*. When Windows restarts, the System Configuration Utility will pop up in an annoying test mode. If no serious problems have cropped up, check *Don't show this message or launch the System Configuration Utility* and click *OK*.

Bring Backup Home

THE ANNOYANCE: Windows XP Professional includes Backup, a basic but handy backup utility (find it in *Start•All Programs•Accessories•System Tools*) that I use on my office computer. I've searched—and searched, and searched—for the same backup program on my XP Home Edition system back at the ranch. Where has Microsoft hidden the utility?

THE FIX: Fortunately, the Windows XP Home installation CD contains Backup. To install it, browse to the CD's valueadd\msft\ntbackup folder, right-click *ntbackup.msi,* and choose *Install*. If (like me) you're unlucky enough to have received a system restore disc with your PC instead of an actual XP installation disc, you may have to hunt for the necessary Backup files. I found the valueadd\msft\ntbackup folder on my hard disk under the Windows folder. If you have enabled packet writing on your system (as described in "Burn It Now" on page 70), Backup will even work with your CD-R/RW drive.

Terminate Temp Files

THE ANNOYANCE: Browsing the Web, installing utilities, and performing other normal Windows activities can cause a

FIX-IT TOOLS

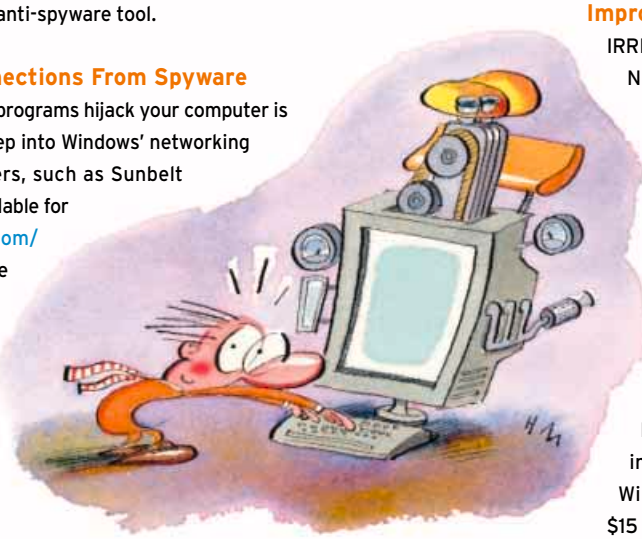
ESSENTIAL ANTI-ANNOYANCE ADD-ONS

Gimme Back My Boot Disk

BEFORE WINDOWS 2000 AND XP, if things went haywire on your PC, you could always reboot it with a floppy to run virus scans, retrieve lost files, and so on. XP lets you make an Emergency Recovery Disk, but most of us wouldn't know what to do with an ERD's few command-line tools. Instead, download Bart's Preinstalled Environment (BartPE) at find.pcworld.com/48610; it's a free tool that creates a bootable Windows rescue CD or DVD from your XP installation disc and can optionally back up utilities, such as Lavasoft's Ad-Aware SE anti-spyware tool.

Recover Network Connections From Spyware

ONE WAY SOME SPYWARE programs hijack your computer is by inserting themselves deep into Windows' networking software. Spyware removers, such as Sunbelt Software's CounterSpy (available for download at find.pcworld.com/48608), should remove the offending software. But such utilities can't always get your network running again. The free WinSock XP Fix (available at find.pcworld.com/48609) gets the information flowing once more.



Organize Photos With Picasa

WINDOWS XP'S CAMERA and Scanner Wizard and the My Pictures folder are better than nothing. But they provide only minimal tools for downloading and organizing your snapshots. Google's free Picasa (www.picasa.com) can perform at least a dozen invaluable photo tricks, including finding duplicates (to save disk space), performing basic image editing (to replace Paint's unchanged-in-decades toolbox), and handling Blogger uploads.

Improve Your IPod Interface

IRRITATED WITH ITUNES? Mad at your Nomad? Most audio players come bundled with interface software that you may have no choice about using and that may not play well with Windows Explorer. But Red Chair Software (www.redchairsoftware.com) sells feature-rich replacement programs customized for lots of players from Apple, Creative, Dell, IRiver, Rio, and Xclef. Red Chair's apps do a better job of integrating your audio player into Windows Explorer. Each costs from $15 to $35, depending on the version.

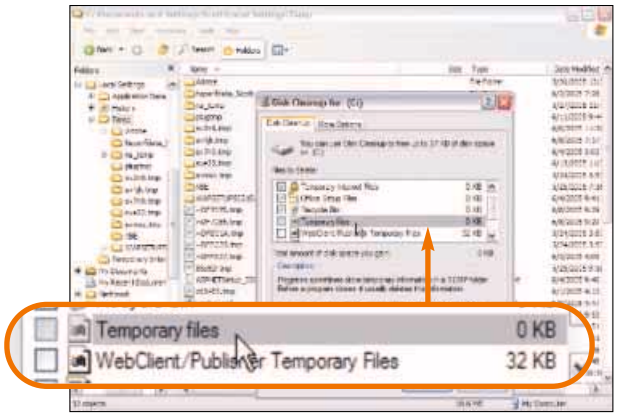


FIGURE 1: WHEN Windows says there aren't any temp files on your hard disk, don't believe it. Find and delete them yourself.

whole bunch of useless files to build up in a hard-to-find Temp folder. (Typically it's located in Documents and Settings*username*\Local Settings\Temp.) Worse, Windows skips this folder when I tell it to delete temporary files.

THE FIX: In Windows Explorer, right-click the C: drive (or other drive, as appropriate), select the *General* tab, and click the *Disk Cleanup* button. Even though the Disk Cleanup tool deletes useless files and thereby frees up disk space, it doesn't touch the Temp file folder under Local Settings (see **FIGURE 1**). So I have to delete these orphaned files manually: To do that, close all programs, navigate to the folder, press **<Ctrl>-A** to select the files, and press **<Delete>**.

Uncover Hidden File Name Extensions and Expose Cloaked Files

THE ANNOYANCE: Windows XP thinks I don't need to see file name extensions and hidden files. Guess what? I do. For one thing, it's just good information as I browse through my stuff—are those images JPEG or BMP files?—but also, virus writers use the default-to-hidden setting to try to trick me into launching their code. With no file extensions showing, I might launch SafePic.jpg.exe, because all I saw in my e-mail program was an icon labeled SafePic.jpg.

THE FIX: To display all file name extensions, open Windows Explorer, select *Tools•Folder Options•View,* uncheck *Hide extensions for known file types,* select *Show hidden files and folders* directly above it (for good measure), and click *OK.*

Halt CPU Hoggers

THE ANNOYANCE: I have closed all but one application to dedicate my system's full resources to a task, but Windows is still sluggish. What gives?

THE FIX: The likely culprit is a program or service that has malfunctioned and continues to run, even though it may not show a window or taskbar icon that you can use to close it. To find and close these CPU hogs, first close all running applications, press **<Ctrl>-<Alt>-<Delete>** to launch Task Manager, and select the *Processes* tab. Scroll down the list of processes until you come to the one that's gobbling up the resources. Select it and click *End Process.* Don't worry about System Idle Process—that simply shows the percentage of processor resources that remain unused.

Enable Hibernation

THE ANNOYANCE: I want to boot up my laptop quickly. But by default, it either shuts down entirely or goes into a battery-consuming standby mode that, in turn, rapidly leads to dead-battery syndrome.

THE FIX: There is a third option: hibernation, where Windows writes the current state of the PC into the hard disk before powering off. You get a quicker boot from hibernation than from a normal shutdown, without wasting battery life. But you have to enable it. Go to Control Panel, click *Performance and Maintenance* in Category View, open *Power Options,* select the *Hibernate* tab, and check *Enable hibernation.*

Keep three things in mind when trying to enable hibernation: You need a sufficient amount of free disk space (I recommend 1.5 times the RAM); you must log in as a Computer Administrator or Power User; and you have to install the latest updates to Windows, your applications, and your drivers. (Windows XP Service Pack 2 fixes a problem with hibernation in computers that use 1GB of memory; however, reports persist of problems with hibernation on SP2 systems that are equipped with 1.5GB or more of memory. Microsoft acknowledges that this is an ongoing issue and will be looking into a solution.)

Security Setbacks

Protect Your PC During Reinstalls

THE ANNOYANCE: A hard disk failure forced me to reinstall Windows. In order to complete the job, I had to go online to download SP2 and other patches. In its newly restored, unpatched state, my machine was defenseless against the Web-connected army of zombie PCs infested with spyware, worms, and Trojan horses targeting any Windows system—including mine. My PC was toast.

THE FIX: Before beginning the installation, physically isolate the PC from the Internet by disconnecting the network cable or phone line. Next, perform the Windows XP installation. Then log on to Windows, go to Control Panel, launch *Network Connections,* right-click the network connection through which you access the ▶

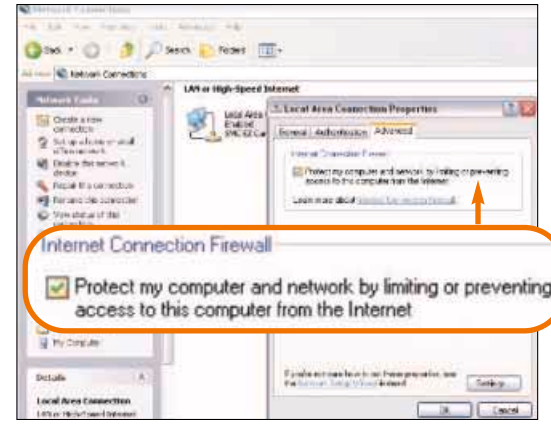


FIGURE 2: UNPATCHED, Windows XP will probably crash before you can download fixes for it over the Internet, unless you first enable its built-in firewall.

Web, and choose *Properties•Advanced*. Check *Protect my computer and network by limiting or preventing access to this computer from the Internet*, and click *OK* (see **FIGURE 2** on the previous page). Now the PC will be safe enough from incoming attacks to visit the Windows Update site (*Start•All Programs•Windows Update*) and download SP2. If you have multiple PCs, consider burning a copy of SP2 (its file size is about 178MB) to disc.

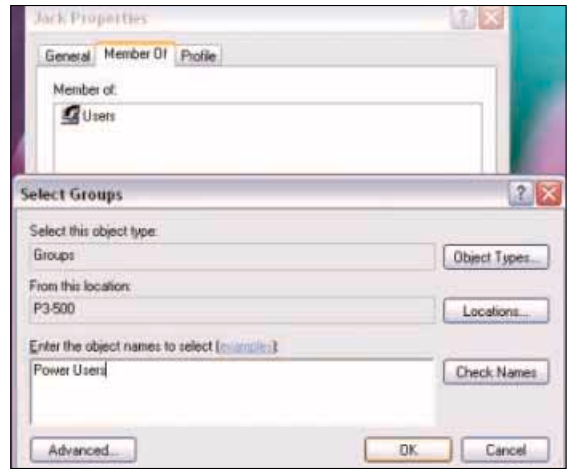


FIGURE 3: DON'T settle for XP Pro's basic user account types when you can choose something safer or more convenient.

Modify User Accounts

THE ANNOYANCE: Windows XP keeps a tight rein on who can do what by way of its user account groups. But running my PC as part of the default, all-powerful Computer Administrator group is risky; any malware that infiltrates my system may inherit the same privileges. Switching my account to the only other level available in Control Panel's User Accounts applet—Limited—ain't so great, either. When I attempt to install an app or perform other administrative tasks from a Limited account, I'm constantly stymied.

THE FIX: Fortunately, other user types exist between these arbitrary extremes, and Windows XP Pro lets me use them (these steps won't work in Home Edition). The Power Users group has fewer rights than the Computer Administrator group, making it safer, but it can still install more applications than Limited accounts. To add an account to the Power Users group, open *Control Panel•Performance and Maintenance* (if you're in Cate-

X64 UPGRADE TIPS

64-BIT WINDOWS IS HERE—WITHOUT THE BENEFITS

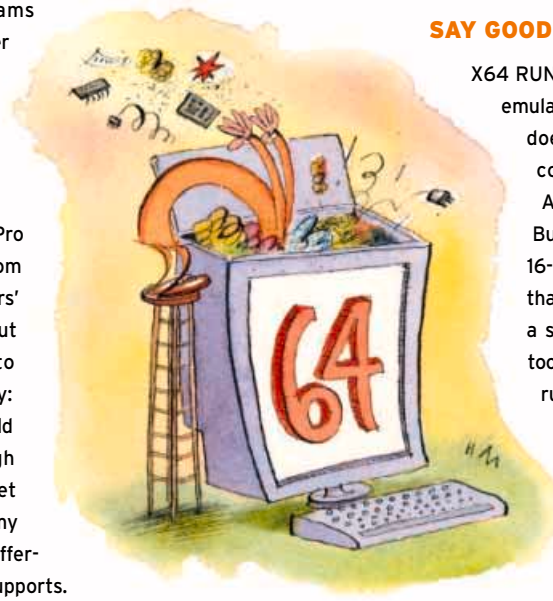
I INSTALLED WINDOWS XP Pro X64 on Dell's Dimension XPS Gen 5—mostly successfully. But only some users will find that the gains outweigh the pains. Review these tips before you upgrade.

IS 64-BIT WINDOWS FOR YOU?

THE BENEFIT of 64-bit computing is that memory- and CPU-hungry apps will perform better than their 32-bit versions. But few 64-bit programs exist, and those that do may not offer much benefit. The 64-bit Firefox I tested ran like a charm, but it performed the same as the 32-bit version.

CHECK FOR DRIVERS

BEFORE SWITCHING from 32-bit XP Pro to 64-bit, download 64-bit drivers from your computer and component makers' sites and burn them to a CD. Without proper drivers, you'll likely run into problems. I learned this the hard way: When I tried to go online, Windows could not find the network card. Although Dell's Web site offers 64-bit ethernet drivers, they were incompatible with my particular card. So I had to install a different network adapter—one that X64 supports.



GET THE FULL VERSION

ONCE YOU UPGRADE your copy of 32-bit XP Pro to X64, you forfeit your license to the 32-bit version. If you run into an incompatibility later, you can't go back to the old version, and you can't legally dual-boot 32—and 64-bit Windows. To make sure you have separate licenses, buy the full version of X64.

SAY GOODBYE TO OLD SOFTWARE

X64 RUNS 32-BIT programs using a 32-bit emulation layer that, as far as I could tell, does not have performance delays. I could run Firefox, Opera, ITunes, Adobe Reader, and OpenOffice.org. But unlike 32-bit XP, X64 doesn't run 16-bit apps, including 32-bit programs that rely on a 16-bit installer (I ran into a snag with an old screen-capture tool). X64 can also balk at utilities that run as drivers. ZoneLabs' ZoneAlarm firewall, Symantec's Norton Antivirus 2005, and Grisoft's AVG Antivirus all failed to install during my informal tests.

Browse to find.pcworld.com/48874 for more details on X64.

gory View)•*Administrative Tools* and launch *Computer Management*. In the left pane, double-click *Local Users and Groups* and select *Users*; in the right pane, double-click the user name whose rights you want to modify (see **FIGURE 3**). Select the *Member Of* tab, and click *Add*. Type **Power Users** in the 'Enter the object names to select' list box, and click *OK*.

WINDOWS WISH LIST

ACCELERATE SHUTDOWNS

I'M GENERALLY VERY PATIENT. But quirks in XP that have complex workarounds or no satisfactory solutions make me a little testy. Such problems top my fix-it wish list for the next version of Windows, code-named Longhorn. For example, it bugs me that shutdowns and restarts can take longer than backing up my PC. And finding the culprit is a tedious process. Why is there no Windows diagnostic tool–perhaps within Task Manager–that will analyze each program not only while it's running but also while you're shutting down or rebooting, so as to pinpoint ones that are malfunctioning?

In the meantime, use process of elimination to find out whether the issue involves an app or a driver, and then which program or driver. If the slowpoke turns out to be a program, close it before shutdown, or patch it if this is a known problem. If it's a driver, use Device Manager to update it. Right-click *My Computer*, choose *Properties•Hardware*, and click *Device Manager*. Right-click the device and choose *Update Driver* to search the Windows Update site for a newer version. To test if a particular driver is at fault, choose *Disable* instead of Update Driver and restart Windows. For more advice, check out Jim Eshelman's Windows XP Shutdown & Restart Troubleshooting tips at find.pcworld.com/48604.

Desktop Disarray

Be Still, My System Tray

THE ANNOYANCE: I can access some of my favorite utilities only through the system tray; but when one of these icons has lain idle for a while, XP "helpfully" hides it.

THE FIX: You don't have to put up with XP's unwelcome assistance. Clicking the arrow that shows hidden icons can be frustrating because, shortly after you click it, it collapses again. It's tempting simply to make Windows always show all of the icons. To do that, right-click the *Start* button or taskbar, choose *Properties*, uncheck *Hide inactive icons* in the 'Notification area' section, and click *OK*. Unfortunately, that approach could lead to a huge system tray that squeezes out program icons on the rest of the taskbar. I prefer to use the *Customize* button instead of unchecking 'Hide active icons'; then I set the hiding behavior for individual icons to suit my needs, as shown in **FIGURE 4**.

Have Explorer (Mostly) Your Way

THE ANNOYANCE: I was getting a headache from configuring Windows Explorer to provide the file and folder information I wanted instead of its default view, every time I opened a new folder.

THE FIX: Fortunately, you can make Explorer remember your preferences instead of its own. First, tweak Explorer to your liking, specifying which details (or attribute columns) it displays, what type of view (thumbnails, list, details, or the like) it opens in, and whether and how files are grouped. To make your custom view Explorer's default view, choose *Tools•Folder Options*, select the *View* tab, and click *Apply to All Folders*. Voilà—all done. I also like to see the folder tree structure (instead of the default task panel) in the left-hand pane and the currently selected folder contents in the right-hand pane, because this arrangement offers the easiest way to drag files from one folder to another. For some annoying reason, though, Explorer refuses to remember this feature, always reverting instead to displaying the task pane. Longhorn will fix this by moving task links to a new horizontal toolbar.

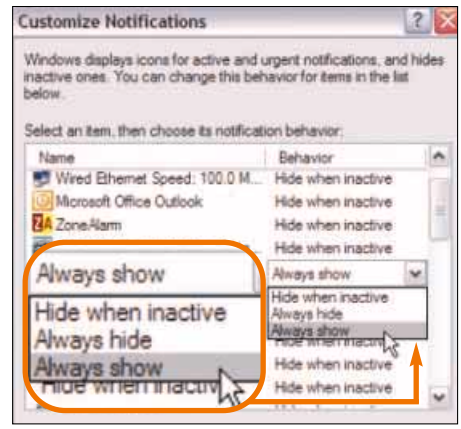


FIGURE 4: TAKE charge of the System Tray Notification Area icons so they will be there when you need them and will vanish when you don't.

Get Instant Desktop Access

THE ANNOYANCE: I keep important stuff that I use frequently—including program icons, downloaded files, and the Recycle Bin—on the Windows desktop. But as soon as I launch a program, the desktop icons on the Quick Launch menu disappear because other elements crowd them out of the visible part of the menu, or because the Quick Launch menu itself isn't visible.

THE FIX: No worries: You can add an icon to your taskbar that will show the desktop in one easy click. First, enable the Quick Launch toolbar, right-click an empty spot on the taskbar, and select *Toolbars•Quick Launch*. The Quick Launch toolbar should display the Show Desktop button by default. If the Show Desktop button in Quick Launch doesn't appear, it may have been pushed off onto the menu's pop-up overflow (indicated by the double-arrow icon) to the right. To keep it handy, ▶

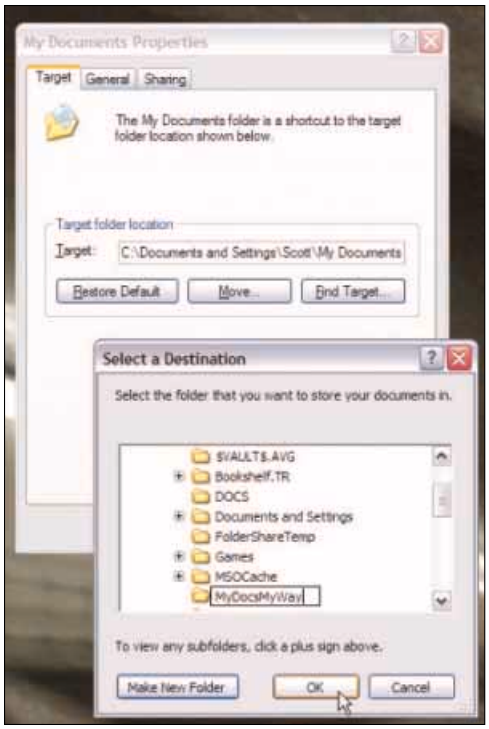


FIGURE 5: YOU CAN put the My Documents folder wherever you want, and Win XP will even help you move it.

drag and drop it onto the visible part of the menu. You can also get instant access to desktop icons without minimizing windows, by adding the Desktop toolbar to the taskbar. Right-click a vacant area of the taskbar and choose *Toolbars•Desktop*.

Point My Documents to Yours

THE ANNOYANCE: Like its predecessors, XP encourages me to keep my files in the My Documents folder. That may be convenient for Microsoft's developers, but it's not for me. I prefer to keep my files elsewhere so that they're easier to browse to, back up, or access from other versions of Windows.

THE FIX: XP is fairly obliging about letting you change the location of My Documents. Right-click the *My Documents* folder, choose *Properties*, select the *Target* tab, and click *Move* to transfer your current My Documents folder and its contents to another location (see **FIGURE 5**). To make My Documents point to an existing folder, click *Find Target* instead of Move.

Put Your Documents at Your Fingertips

THE ANNOYANCE: Windows puts a link to My Documents on the Start menu so I can open an Explorer window to my files quickly. But if what I want to do is open a particular file ASAP, I have to click, click, and click again to launch it. What a pain.

THE FIX: If you like the way the Start menu's submenus unfold automatically, make My Documents work the same way. Right-click the *Start* button, select the *Start Menu* tab, click *Customize*, and select the *Advanced* tab. Next, scroll down the 'Start menu items' list to the 'My Documents' section, select *Display as a menu*, and click *OK*. Applying the same operation to some of the other Start menu items listed, such as Control Panel and My Computer, can expedite access to those parts of Windows, as well.

WINDOWS WISH LIST

'REPAIR' FOR DEAD CONNECTIONS

HERE'S ANOTHER ITEM that Microsoft needs to add to its Longhorn to-do list: fixing its current network repair button. I have tried using this button when my network connection suddenly goes kaput, but it has never worked for me. Why does Windows taunt its users this way?

In lieu of a functional Repair button, I've sometimes had success using the command prompt's ipconfig command—but it's easier simply to disable and reenable the network connection. To do this in Windows XP, open Control Panel's Network Connections, right-click the connection, select *Disable*, right-click the connection again, and select *Enable*. If that sequence does not do the trick, power-cycle or reset the cable or DSL modem and the router, if any, that you have between your computer and the broadband connection.

Connection Conundrums

Banish Wi-Fi Pop-Ups

THE ANNOYANCE: Several wireless networks I connect to have weak signals. The connection is usually there, but occasionally it wavers in and out of existence. Each time this happens, Windows notifies me (via little text balloons that pop up from the connection's system tray icon) that the connection has been lost and then reestablished. After 10 or 15 of these messages appear, I'm ready to live without a wireless network, if only for the freedom from incessant status updates.

THE FIX: Fortunately, I found a way to pop those bothersome balloons permanently. Right-click the connection's system tray icon and choose *Open Network Connections*. Right-click the connection there, choose *Properties*, uncheck both *Show icon in notification area when connected* and *Notify me when this connection has limited or no connectivity*, and click *OK*. This works with wired network connections, too.

Put ActiveX on Hiatus

THE ANNOYANCE: I'm surfing along the Net with Internet Explorer, when suddenly hypertext links appear on a page that I'm sure didn't have them before. The culprit? Adware that surreptitiously installed itself on my PC, due to overactive ActiveX controls, which open the door to programs downloaded from Web pages.

THE FIX: The safest policy is to hobble ActiveX. Choose *Tools•Internet Options*, select the *Security* tab, choose the *Internet* zone, and click *Custom Level*. Scroll down to the 'ActiveX controls and plug-ins' ▶

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section, and set 'Download signed ActiveX controls' and 'Script ActiveX controls marked safe for scripting' to *Prompt*—or get really tough and set them to *Disable*. (*Prompt* will generate dialog boxes asking you to approve ActiveX downloads. *Disable* will cause sites that require ActiveX not to work right.) Set *Download unsigned ActiveX controls* as well as *Initialize and script ActiveX controls not marked as safe* to *Disable* (if they aren't already; this is the default in SP2). Legions of Firefox converts who surf daily without ActiveX don't miss it, and for the most part neither will you. If you can't do without a site that requires these settings, temporarily enable ActiveX for safe or signed controls. By the way, XP SP2 adds some protection against malicious ActiveX controls, and the forthcoming Internet Explorer 7 browser promises to make ActiveX safer when used under Longhorn by making the browser fully functional in a low-rights user account.

WINDOWS WISH LIST

SMARTER FILE OPERATION FIXES

MY LAST FEATURE REQUEST FOR LONGHORN: Windows should identify and isolate bad files during batch operations. When I try to do the same thing to 500 files—like drag them from one folder to another—odds are that there will be some hangup with one of them. When that occurs, Explorer just quits, telling me there was a problem, but leaving some of my files moved and the rest unmoved. Even if I can find and fix the error, the task of hunting down the unprocessed files and completing the operation drives me nuts—and there's no guarantee that there won't be another bad file in the batch.

There go 10, 20, 30 minutes of my life that I'll never get back. Instead of quitting, Explorer should isolate the problem files, much as a spyware or antivirus scanner does, but continue to process the ones that have no problems. That way, I get the job done and can focus exclusively on the trouble-making files when that's over.

Unfortunately, the only solution currently available is to press <Ctrl>-Z to undo the move operation; close all programs that might have files open; and then try, try again.

Media Mayhem

Burn It Now

THE ANNOYANCE: Windows Explorer provides an interface to my CD-R/RW drive that lets me drag files to that drive in Explorer. But often I drag, I drop—and nothing happens. Rather than actually writing the files to the recordable CD, Windows merely queues them in a folder (using up hard disk space in the process) until I'm ready to write and close the CD.

THE FIX: First make sure you installed the packet-writing driver that came with your drive or PC (Roxio Easy CD Creator and Nero Burning ROM supply their own packet-writing drivers) by looking in the program's Start menu folder for a shortcut (for example, Roxio's is called Drag-to-Disc). Even if you have this driver installed, however, Windows may still queue the files for later writing. The solution is utterly counterintuitive. Right-click the CD writer in Explorer, choose *Properties*, select the *Recording* tab, and uncheck (that's right, *dis*able) *Enable CD recording on this drive* (see **FIGURE 6**). From now on, when you drag files and folders and drop them on the recordable drive's icon, the burner will write them to the disc immediately, using the packet-writing driver.

Recover Your Autoplay

THE ANNOYANCE: Once upon a time, Windows anticipated my every move, popping up a wizard when I plugged in my camera, or launching my media player when I inserted a music CD. Then one day (after I installed a new program, or clicked—without reading carefully—a pop-up dialog box), Windows forgot what to do with my music, photos, and other media files.

THE FIX: Right-clicking the drive or device in Explorer and choosing Properties will lead you to an Autoplay or Events tab where you can reestablish which program should do what when you plug in, but Autoplay settings sometimes remain stubbornly broken. Microsoft's Autoplay Repair Wizard (available at find.pcworld.com/48612) fixes the botched settings. Although the Microsoft download page asks you to validate your copy of Windows before downloading the wizard (how annoying!), you can, perversely enough, opt out of validation and still download the fix. ■

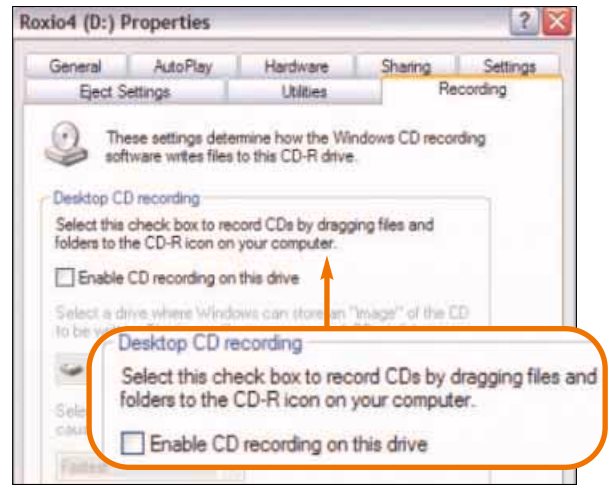

FIGURE 6: MAKE Windows Explorer write files to recordable media immediately by telling it to do exactly the opposite.

PC World's Internet Tips columnist Scott Spanbauer spends hours meditating to get over annoying Windows problems.

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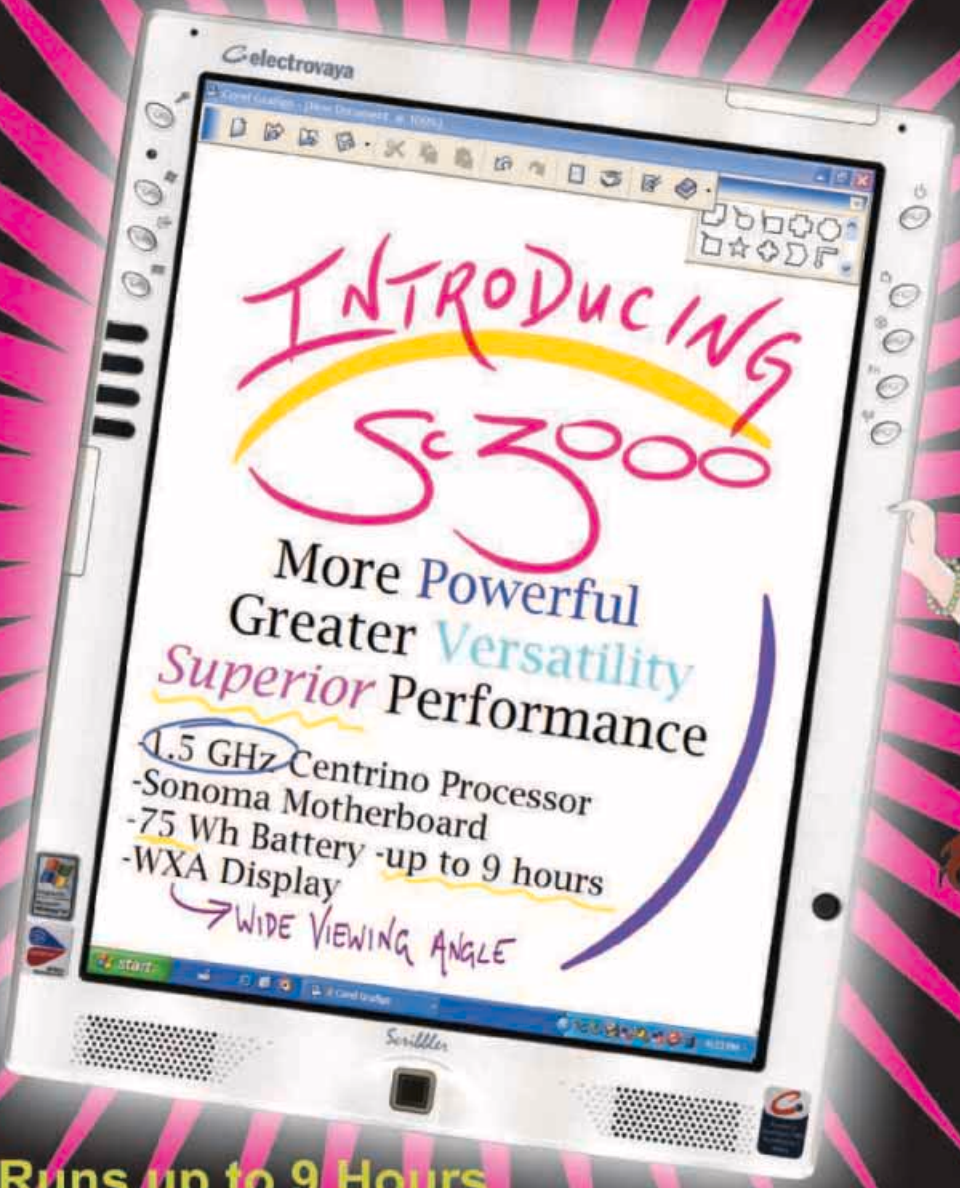

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The Truth About Windows Alternatives

Can an annoyed Windows user find happiness in a multiplatform environment? Our editor tried the Mac and Linux—and came away impressed.

BY ERIC DAHL

HERE AT *PC WORLD*, we've become pretty good at fixing Windows' many annoyances, but even we can't do it all. As a longtime Windows user, I've bent my Windows PCs to my will with tips from stories like this month's "Wipe Out Windows Annoyances." But sometimes that isn't enough. Windows' security problems alone are enough to make even the most die-hard Microsoft booster question whether the grass is greener on the other side of the CPU.

Alternative operating systems look better all the time. If you like open-source software, such as the Firefox browser, you have to wonder whether Linux, too, is worth a shot. Plus, the stunning look of OS X (and the affordability of the Mac Mini) intrigued me. ▶

ILLUSTRATIONS BY HAL MAYFORTH

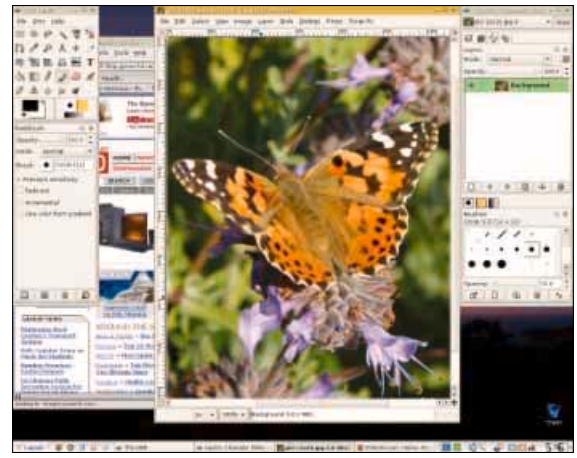
But getting started with a new OS is a big adjustment. Sure, Windows can be annoying, yet most of us can't give it up entirely. Would it help to do most of my work in Linux or Mac OS, switching back to my Windows box when necessary? Or would a cross-platform setup introduce its own hurdles and annoyances, wiping out any benefits found in the alternative OS?

To find out, I spent a few weeks working with Xandros Linux and Mac OS X 10.4 (aka Tiger) in a mostly-Windows computing environment. Along the way, I dug into some of the conventional wisdom that surrounds Linux, Mac OS, and Windows, reexamining the preconceptions many people still have about these different operating systems.

Xandros OS 3 Deluxe

AS A FREE OS THAT can run on your existing PC hardware, Linux has a significant advantage over Tiger. The first step in installing Linux is to pick a distribution that bundles together the key OS components and drivers you'll need. Most distributions also come with a large bundle of free, open-source applications, including everything from an office suite and a Web browser to games and image editors.

Many Linux distributions are available as free downloads, most often in the form of an .iso file that you burn to a CD using your CD-mastering software (see find.pcworld.com/48932 for a list). There's a catch, however: Free versions of Linux rarely include any technical support beyond what you'll find in online forums and FAQs on the distribution's Web site.



XANDROS INCLUDES the free, powerful GIMP photo editor.

But the deluxe versions—like SuSE Professional 9.3 ($60 and up, www.suse.com), or the Xandros Desktop OS Version 3 Deluxe Edition distribution ($90, www.xandros.com) that I chose—often do offer tech support. Xandros also provides extensive printed documentation and some well-written FAQs on its support site.

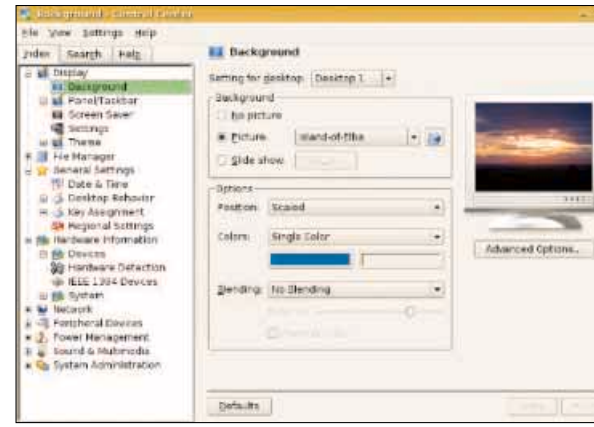
Once my Xandros test machine was set up, life in Linux was easy to get used to—and surprisingly uneventful. Apart from a few niggling issues that I'll discuss below, I had relatively few problems. I could accomplish all the tasks I do in a normal workday—editing Word and Excel files, browsing the Web, moving files around our local network, and using IM and e-mail. The KDE desktop environment felt familiar and easy to navigate, while providing a few small enhancements like multiple desktops. In that sense, Xandros proved to be a more than capable alternative to Windows.

But while working in Xandros was simple enough, I didn't feel that I'd gained much from making the switch. Low cost and high security are among the best things Linux has going for it, making it a great choice if you require a bulletproof (or kid-proof) workhorse machine. Budget-conscious gamers might want to try a dual-boot setup: Boot into Windows for the games that require it, but work in Linux for most other tasks.

Beyond those two scenarios, I couldn't come up with many practical reasons for an intermediate-to-advanced Windows user to convert. My Windows software is already paid for, and with a capable firewall, good antivirus protection, and sensible computing practices, I personally can't say I'm too concerned about malware infecting my Windows PC. Still, Linux has a lot to recommend it, as I saw when I dug into some common Linux beliefs.

Conventional Wisdom: Linux is difficult to install and get running.

Reality: Well, that certainly wasn't my experience—the basics of installing Linux have gotten much easier. To get my test machine up and running, I first set my PC's BIOS to boot from the optical drive (you may not need to do this step). Insert the first Xandros CD, reboot, and you get a polished install routine that walks you through the decisions you have to make



THE LINUX CONTROL CENTER looks like Windows' Control Panel.

when installing any OS, such as time zone for the clock, networking support, and printer drivers.

Xandros let me choose to wipe out the version of Windows on my hard disk and start fresh, or to set up a dual-boot system that could run Windows or Xandros. I opted to dual-boot; all told, my PC was ready to go a scant 30 minutes after I began the installation.

I ran into a couple of problems after setup. The first networked printer I tried, an old HP LaserJet 5si, simply would not print, even though the drivers seemed to install correctly. A newer HP printer, with a Linux driver from HP, worked perfectly. Xandros also couldn't identify my 21-inch ViewSonic monitor. A quick change to a setting in the KDE Control Center sorted that out. (Control Center works much like Windows' Control Panel.)

SPOTTY HARDWARE support can frustrate some new Linux users.

My test setup used standard PC hardware, but it always pays to check your hardware for Linux compatibility *before* installing the new OS. Wireless network adapter support, for example, is still a bit sketchy (see find.pcworld.com/48614 for more about this tricky problem).

Conventional Wisdom: Linux is more secure than Windows.

Reality: It almost certainly is. These days, you'd be crazy to run a Windows box without every hotfix installed, as well as antivirus software, a firewall, and a spyware scanner. Linux and Mac users rarely need to worry about most of those tools. The vast majority of viruses, spyware, and adware all focus on Windows.

Do Linux and other open-source projects have their own security issues? Definitely. The Mozilla Foundation, for example, has released several updates to fix holes that were found in its Firefox browser. Open-source software is not a panacea, but programmers often fix, and release patches for, serious security holes in their tools within hours of discovery.

Linux was designed to be a multiuser OS, so security has historically been more of a focus for Linux users. Running a firewall on your Linux desktop system is still necessary, and the Deluxe version of ▶

THE NEXT WINDOWS

MICROSOFT'S LONGHORN PLAYS CATCH-UP

THE BETTER SECURITY, stunning visuals, and useful productivity enhancements in Tiger and Linux are what made us consider Windows alternatives in the first place. What is Microsoft doing to close the gap? Here's what we know at this point about the ways the Longhorn operating system—due to be released in late 2006—will try to catch up with our favorite features from the Mac and Linux.

Search

LONGHORN WAS SUPPOSED to be built around a completely new file system called WinFS, but that won't make it into Longhorn's initial release. Microsoft planned to use WinFS to power up Windows' search capabilities, but the company hasn't given up on improving Windows' desktop search capabilities entirely. Longhorn will let you create virtual lists of files based on search terms, much like the Smart Folders you can create with Mac OS's Spotlight. So far, though, Longhorn's search capabilities don't appear to have the same slick autogrouping function that Spotlight has.

Security

"SAFE AND SECURE" is one of the six key pillars on which Microsoft claims to be building Longhorn, and the OS will finally include the two-way Windows firewall that Microsoft originally wanted to have ready for XP Service Pack 2. Beyond that, however, few details have emerged about Longhorn's expanded security features. At press time, none of the security enhancements have made it into the early builds that have been released to developers.

Task Switching

WHILE IT'S NOT NEARLY the same as Tiger's Exposé feature, Microsoft's Alt-Tab Replacement PowerToy for Windows XP (find.pcworld.com/48618) displays a thumbnail preview as you Tab through each running application's icon. Microsoft hasn't announced or shown anything like Exposé as part of Longhorn, but the visual enhancements that the company is adding to the OS—see below—certainly would make such a thing possible.

Visuals

LONGHORN WILL lend some slick visual touches to Windows. The OS will use a new graphics engine called Avalon that employs the 3D rendering muscle built into your graphics card. Transparency effects, 3D rotating, and other animations all make appearances in the Aero desktop theme, which also brings the brushed-metal look to the Windows world. But Longhorn's visuals aren't just about eye candy: Microsoft has shown several new folder views that display previews of the documents within them to aid in navigation.

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Xandros ships with one included (but not enabled by default). Xandros Deluxe also comes with a tool called KDE Password Wallet, which stores Web site log-ins in an encrypted file. XP's own password manager doesn't offer nearly as good security for your stored passwords.

Conventional Wisdom: Moving data files back and forth between Windows and Linux can cause problems.

Reality: Not as many as you may think. OpenOffice.org worked remarkably well as a Microsoft Office substitute. In my tests, I encountered no significant glitches, even when editing Word documents that used revisions mode—historically a problem for most Office clones.

And if OpenOffice.org isn't cutting it, you can always install Microsoft Office itself with the help of CodeWeavers' CrossOver Office, which emulates enough of Windows to get Office (and other prominent Windows apps) running under Linux. Version 4.1 shipped with my Deluxe copy of Xandros.

Some of the other apps I tried didn't work as well. ITunes, for example, is listed as a supported application, but I couldn't ever get sound to work under CrossOver.

MY TRIAL OF Mac OS X 10.4, or Tiger, was a different animal altogether. The hardware was the most obvious difference. A 20-inch IMac served as my main Mac OS test machine, and from the moment I moved it into my office, I noticed something: Coworkers started stopping by my desk just to take a look at the IMac, and almost without exception, they all ended up touching it.

That's an impressive feat of hardware design, but the OS itself is what captured my imagination. Graphically, Tiger runs rings around both Windows and Linux. Transparency effects, elegant fades and swooshes, and high-resolution icons abound. Often such visual gloss becomes tiresome, but in Tiger most of the effects felt natural and added to my enjoyment of using the OS.

As my Linux test machine did, the IMac integrated with our office network just fine, and soon I was happily working with the Mac versions of Office and Firefox to accomplish my standard workday tasks. But working with Tiger and the IMac took quite an adjustment. A few hours with the minimalist Mac mouse was enough to send me hunting for a wired USB mouse—or any USB mouse, as long as it had at least two buttons and a scroll wheel. Any Windows user making the switch should invest in an alternative mouse before even booting up their Mac. The system's cramped wireless keyboard was the next to go after the ninth time I hit the <F13> key instead of <Delete>.

Once that was squared away, I began to really enjoy Tiger. Whereas my Linux test machine was an easy transition that didn't feel as if it delivered much value, moving to Tiger had several immediate advantages. A task-switching feature called Exposé is my favorite. When you have multiple windows open, simply flicking your mouse over to a hot-corner of the screen or pressing a hot-key displays a thumbnail of each open window. Just click the one you want to bring it to the foreground. It's a decent productivity boost for anyone who likes to work with lots of windows at once, with the added benefit that it simply looks amazing.

TIGER'S SPOTLIGHT is a fast file finder.

Spotlight, Apple's new desktop search feature, provides the other major advantage of Tiger. Click the little magnifying glass in the top-right corner of the screen to bring up a search box. Spotlight will instantly home in on the most relevant results and then group them all into useful categories such as applications, documents, and e-mail messages. And you can save a Spotlight query as a "Smart Folder," which updates itself. Another cool feature, Dashboard, offers widgets to simplify various tasks on the desktop.

Finally, once you consider the better security and lower likelihood of virus attacks, Macs start to look a lot more attractive. But first you have to assess the cost. Right off the bat, you're looking at purchasing new hardware. Once you factor in the cost of peripherals and Mac-compatible software, adding a Mac to your computing mix gets expensive. Is it still worthwhile? Let's look at some widely held beliefs about Macs.

Conventional Wisdom: Mac OS is more intuitive, but it's also underpowered.

Reality: Arguably wrong on both counts. Mac OS has often been way ahead of Windows in adopting intuitive interface design concepts; its adherence to Fitts' Law (see find.pcworld.com/48616) is one example. Fitts' Law says, among other things, that the corners and sides of computer screens are the easiest targets to hit, because no matter how far past the target you move your mouse, the pointer ▶

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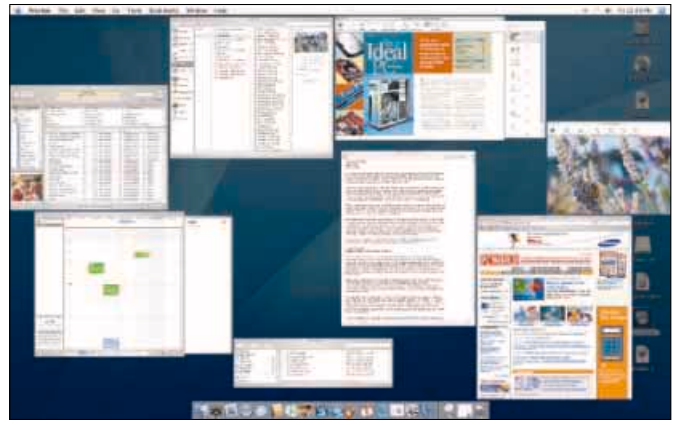
stays planted at the edge of the screen. Mac OS's dock, application menus, and various corner menus all take advantage of Fitts' Law. Originally the Windows XP taskbar didn't, although that has now changed.

For some users, whether an OS is intuitive misses the point. While I can understand that there are usually good reasons why the Mac OS interface works differently, breaking many years of habit is a maddening process. I've been using Windows for years, so any system that deviates from the way Windows works will be an adjustment. I expect scroll bars to have arrows at both ends, not just one end. I'm used to pressing <Ctrl> with my pinky finger to use most keyboard shortcuts.



TIGER'S EXPOSÉ feature gives you ready access to many windows at once.

But the real power in Tiger comes from features like Spotlight search and Exposé—great tools that you won't find in Windows. An easy-to-use scripting applet called Automator helps make repetitive tasks simple. And like Linux, Mac OS was built on Unix-like underpinnings, so all the command-line access you could ever want is there, if you need it. In short, the old saw about Macs feeling like computers with training wheels doesn't apply.

DASHBOARD'S desktop widgets simplify tasks like checking the weather (top).

Conventional Wisdom: The Mac hardware is expensive for what you get.

Reality: Sad but true, especially if you're just comparing hardware specs. The least expensive Mac you can purchase right now is the $499 Mac Mini, which comes with a mere 256MB of RAM and a 40GB hard drive. If you move up to the PowerMac systems, where a high-end, dual-processor G5 goes for $2999, a comparably priced PC would ship with twice the hard-drive space and memory, a much better graphics card, extras such as built-in wireless networking, and very likely a monitor.

That is not to discount the value in well-designed hardware. Macs look great, and they frequently incorporate functional design touches. Top-of-the-line G5 models, for example, are water-cooled, keeping them quiet, as well.

As Apple transitions to Intel processors next year, it might bring Mac prices more in line with those of their PC counterparts. Still, most analysts expect Macs to retain a healthy price premium.

Besides hardware, a Windows user shifting to the Mac has to consider the cost of compatible software, too. Microsoft Office is probably a must, so that's $400 right there. Any other paid software that you need to run must also be added to the tally.

Conventional Wisdom: Mac OS lacks applications.

Reality: Sort of. Clearly, the sheer volume of Windows applications dwarfs the number that are available for Macs. But almost all of the major productivity apps have Mac versions. Microsoft Office, Adobe Photoshop and InDesign, Macromedia's Web development and design tools, and video editing tools like Adobe Premiere—not to mention Apple's own Final Cut—are all Mac-ready.

But the one glaring hole in Mac software is games. While some popular titles like World of Warcraft, Doom 3, and many real-time strategy games have Mac versions, you won't find Half-Life 2, Tom Clancy's Splinter Cell, or a lot of other popular PC games on the Mac. When they do make the leap, it's often several months after the PC game release. The transition to Intel processors may help close the gaming gap by introducing yet another common component between the two architectures. So perhaps we'll soon see more Mac-enabled games.

A LOOK TO THE FUTURE

IF YOU WANT to take a break from your Windows annoyances right now, there's good news. You'll face a significant adjustment period when you pick up either a Mac or Linux, but adding a different OS to your computing environment has never been easier.

Stable, refined Linux distributions like Xandros provide an alternative OS that you can install on your existing PC hardware. But if I'm going to spend my time and money adjusting to a different OS, I want it to actually enhance my computing experience. That's what I found in Tiger. Amazing visuals, helpful tools like Spotlight, and superior overall polish provide clear benefits over Windows. ■

Eric Dahl is a senior editor for PC World.

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August/September2005

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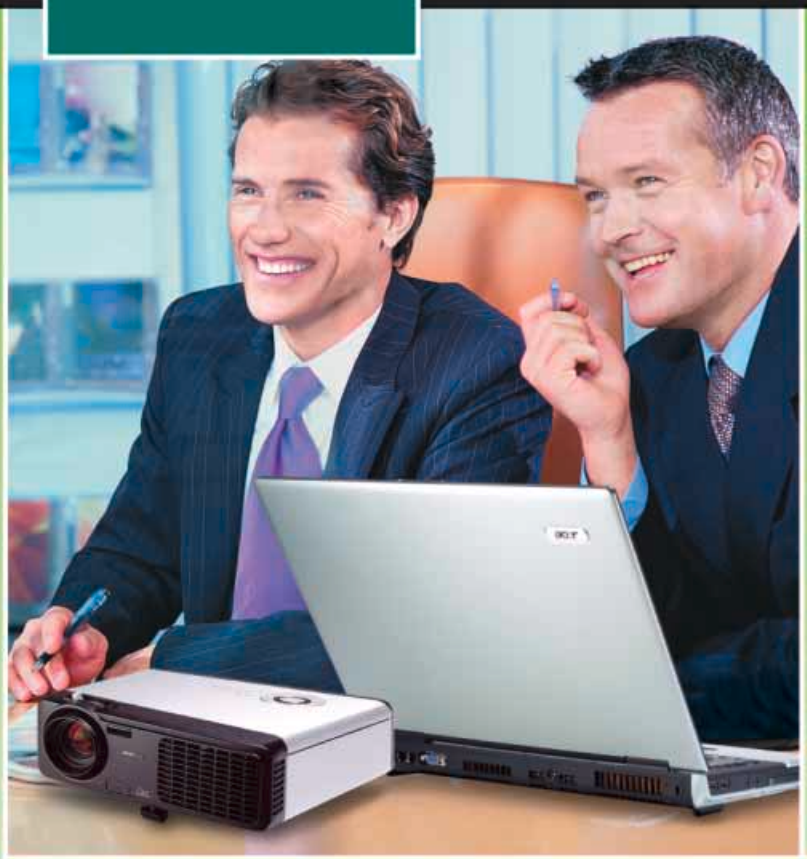

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[1] Enhanced Virus Protection (EVP) is enabled by Microsoft® Windows® XP Service Pack 2. By default, EVP will protect the user's Windows operating system only. Users must enable the protection of their applications and associated files to be protected from memory buffer overrun attacks. AMD and Microsoft strongly recommend that users use third-party anti-virus software as part of their security strategy.

[2] When referring to storage capacity, GB stands for one billion bytes and MB stands for one million bytes. Some utilities may indicate varying storage capacities. Total user-accessible capacity may vary depending on operating environments.

[3] For a free copy of the standard limited warranty end-users should see a reseller where Acer products are sold or write to Acer America Corporation, Warranty Department, P.O. Box 6137, Temple, TX 76503.

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93 Single-PC
94 Network
96 Direct-Attached

BY ALAN STAFFORD
TESTING BY WILLIAM WANG

PHOTOGRAPHS BY JOHN KUCZALA

YOU PRESS ONE BUTTON to pop popcorn in the microwave. You press one button to close your garage door. You press one button to start up your PC, and you press one button to sync your PDA with your PC. One button is easy to understand; one button, you can remember how it works.

The need for simplicity is why so many of today's external storage drives offer the ease of one-button backups. Press one button, and you can back up your system, making copies of all your vital info, photos, and MP3s—so your data is safe from the menaces of viruses, accidental deletion, and sudden hard-drive death.

Of course, today's backup products are more than just a hard drive and a button. Some devices integrate features like media card slots, USB hubs, or print servers; still others have RAID for added data redundancy. Often drives bundle backup applications that can further automate your backups—even if no button is in sight. (See "Burlier Backup Software Helps Safeguard Data" on page 94 for more information on these utilities.)

Narrowing down your backup-device choices from among the plethora of available storage products is the first step. Optical discs continue to be useful for archival backups of photos and other data you intend to store for the long haul; but for everyday system backups, you can't beat the convenience and speed of external hard drives for full backups. Not only are hard drives reasonably priced, but their high capacity means your PC can perform full-drive backups unattended, without your having to swap discs.

We evaluated 16 external hard drives, divided into three categories. The first category features seven USB- and FireWire-connected hard drives suitable for single-PC backup. The second category includes six devices that connect to your network via ethernet and provide an easy-to-access backup destination for multiple PCs. The final category addresses high-capacity or redundant backup needs using direct-attached storage; the three devices of this type can connect to your desktop PC or to a server, and, in the configurations we tested, offer up to 1.6 terabytes of storage.

WESTERN DIGITAL'S Media Center has backup buttons.

Most of these storage devices can do more than just backups. However, for this review we evaluated each product for its viability as a backup device, and the PC World Test Center structured its tests accordingly. We measured performance by using Windows XP's Explorer to copy 3.06GB of files and folders, and then by conducting a full, 12.1GB system backup using the software bundled with each product. If the product lacked backup software, as many of the network-attached and direct-connected RAID drives did, we tested it with EMC Dantz's Retrospect Professional 7, our 2005 World Class pick for backup software.

We tested each device with file compression turned off and verification at the default setting; likewise, we tested the drives using their default file system—FAT32 or NTFS—and RAID settings. We tested the network drives using their ethernet connection over a gigabit ethernet switch; for the remaining devices, we tested using USB 2.0.

A few of the products stood out: In the single-drive category, we selected Western Digital's 320GB Dual-option Media Center as the Best Buy for its physical design (which includes media card slots and a USB hub). In the networked category, Maxtor's 300GB Shared Storage Drive earned a Best Buy for its features and design. Silicon Image's SV2000 was a favorite in the direct-attached category because of its speed—nothing else came close. Unfortunately, while the vendor's suggested price for the unit is $1195, the best price we could find at press time was a whopping $2200, which prevented us from declaring the 800GB unit a Best Buy.

MORE ON BACKUP AT PCWORLD.COM

WANT TO FURTHER HONE your backup regimen? We've assembled a bevy of content related to backup at find.pcworld.com/48948. Each of the charts in this roundup is enhanced and expanded online, and we also provide information about alternative backup approaches. DVD is well suited to archiving, as well as to backing up specific content to complement your full system backup; consult our *Top 10 DVD Drives* chart for our picks. If portability, not capacity, is your goal, see our review of pocket-size hard drives and USB flash-memory drives that you can use as an alternative to DVD. If off-site redundancy, or hardware-free backup, is what you're after, the five online backup services we review will deliver, albeit at a price. We've also pulled together a collection of shareware and freeware backup utilities from our Downloads library.

Single-PC Backup Savvy

WE TESTED SEVEN external hard drives well suited to single-PC backups, in which you back up a large number of files, or even an entire desktop system, to an individual hard drive.

Five of the drives made our chart: Hammer Storage's $330 Desk Hammer (400GB), Iomega's $380 Desktop Hard Drive Triple Interface Platinum Series (400GB), Maxtor's $260 OneTouch II (300GB), Seagate's $330 Pushbutton Backup (400GB), and Western Digital's $280 Dual-option Media Center (320GB). (For more details about CMS Products' $500 ABSplus Desktop Backup System (400GB) and IOGear's $290 Tri-Select Combo ION Drive (250GB), see our expanded features and performance chart online at find.pcworld.com/48950.)

Of the chart-making drives, only the Iomega model lacked a convenient, front-mounted button for initiating a backup (Western Digital's drive has two buttons). Seagate's model is one of the most attractive of the lot, as well as one of the most versatile. You can orient the drive either horizontally or vertically, and the design lets you lock more than one in a secure stack (in the horizontal position). Western Digital's Media Center has a gracefully sculpted surface, which is raised on one end to accommodate its integrated eight-in-one media card reader; the unit also incorporates a two-port USB hub (one port is handily located up front).

The Maxtor, Seagate, and Western Digital drives also offer FireWire 400 ports. The Iomega supports both FireWire 400 and the newer FireWire 800, which increases the maximum throughput rating from 400 to 800 megabits per second.

Hammer Storage's Desk Hammer beat the rest of the single-drive pack in our copy files and folders test, taking 34 percent less time than the average of the other four drives. Even so, just 93 seconds separated the Hammer Storage drive from the last-place model (Western Digital's Media Center). One factor contributing to the Hammer's fine relative performance is that it's the only drive of the group preformatted to use the NTFS file system, which is more efficient than FAT32. Most external drives ship preformatted to use FAT32 because it works out of the box with more operating systems (NTFS works with Windows NT, 2000, and XP, not older operating systems).

SOFTWARE SUBTLETIES

THE DIFFERENCES in the drives' performance became more evident when we did a full backup, using the backup software that comes with each drive. Here, the Iomega drive led the pack, completing our full backup in an impressively quick 9.5 minutes. Seagate's drive finished last, completing the task in about 23 minutes.

All of the drives shipped with backup software utilities, which varied in capabilities and ease of use. We most liked ▶

FEATURES COMPARISON

TEST Center

EXTERNAL DRIVES OFFER SINGLE-PC BACKUP

THE IOMEGA DRIVE WON OUR performance tests, but the Seagate and our Best Buy, the Western Digital, have better designs.

	USB/FIREWIRE HARD DRIVE	Specifications	Performance (in min:sec)		Bottom line
			Copy files	Full backup	
1	Western Digital Dual-option Media Center Best BUY $280 (★★★★☆) find.pcworld.com/48638	• 320GB • USB 2.0, FireWire 400 • Retrospect Express 6.5	4:00	19:06	This reasonably priced model has less capacity and is slower than competitors; but with media card slots and a two-port USB 2.0 hub, it's more than just a storage drive.
2	Seagate Pushbutton Backup $330 (★★★★☆) find.pcworld.com/48640	• 400GB • USB 2.0, FireWire 400 • BounceBack Express 6	3:43	22:55	Unit has great design and documentation. It's a little slow when using its limited bundled backup software, but competitively fast when simply copying files.
3	Iomega Desktop Hard Drive $380 (★★★★☆) find.pcworld.com/48642	• 400GB • USB 2.0, FireWire 800 and 400 • Automatic Backup Professional 3.2	3:41	9:25	Noticeably swifter at system backups than the other drives here. Its included PC software can automatically back up changed files; its Mac software is Retrospect Express.
4	Hammer Storage Desk Hammer $330 (★★★★☆) find.pcworld.com/48644	• 400GB • USB 2.0 • Retrospect Express 6.5	2:27	16:43 [1]	This model was fastest at our drag-and-drop copying, in part because it was the only drive preformatted with NTFS. USB-only, but otherwise a good value for the money.
5	Maxtor OneTouch II $260 (★★★½☆) find.pcworld.com/48645	• 300GB • USB 2.0, FireWire 400 • Retrospect Express HD	3:33	18:46 [1]	Its moderate capacity, price, and performance (when formatted as FAT32) are pluses; but Maxtor hobbles this drive with oversimplified Retrospect Express HD software.

FOOTNOTE: [1] Data verification enabled by default. **CHART NOTES:** For copy files (and folders), we copied 3.06GB of data using Windows XP Explorer. For full backup, we tested all drives using the bundled backup software, with data compression off; data verification was disabled, unless otherwise noted; 12.1GB of data was backed up. Street prices are as of 6/25/05.

EMC Dantz's Retrospect Express Backup 6.5, which shipped with the Hammer and Western Digital drives. This version has a slew of features, including the ability to set up different backup routines, as well as the flexibility to change compression and verification settings.

We least liked the simplified Retrospect variant, called Retrospect Express HD, that came with Maxtor's OneTouch II. The app doesn't allow scheduling of multiple backups, and you can't turn off compression and verification settings.

Iomega's drive includes the full version of its own excellent Automatic Backup Professional 3.2, but Seagate ships only a limited version of CMS's BounceBack Express 6 utility with its drive.

Backup Over a Network

AS HOME AND SMALL-OFFICE networks continue to proliferate, so too do the computers attached to those networks—PCs that need to be backed up somewhere. Networkable drives provide a single backup destination, and also make it easy to access and restore your files from any system connected to the network.

We tested and ranked five devices that connect to your network via ethernet, with capacities ranging from 300GB to a full terabyte. In this group, we looked at Adaptec's $1470 Snap Server 2200 (500GB), Buffalo's $1000 TeraStation (1TB) and $400 LinkStation Network Storage Center (300GB), Maxtor's $350 Shared Storage Drive (300GB), and Western Digital's $400 NetCenter (300GB). We also considered Mirra's $750 Personal Server (400GB), but its inability to work with system backup software kept it from making the chart. (For more on the Mirra, see find.pcworld.com/48952.)

Not all of these devices come well prepared for backup out of the box. The Western Digital and the Maxtor don't come with backup software at all. For its TeraStation, Buffalo provides its own Easy Backup, a crude utility that makes restoring files difficult (it shows you only the folders and the dates you backed them up, not what's inside the folders).

With its LinkStation Network Storage Center, Buffalo bundles LinkStation Backup, for use with multiple clients; but in our

SOFTWARE

Burlier Backup Software Helps Safeguard Data

WHEN YOU PICK a backup program, be sure it has the features and capabilities that will complement your intended backup routine. Many of the drives we tested shipped with a limited or older version of backup software. If you feel constrained by your software—or if the device you want to use doesn't have software—take a look at how the major backup programs compare.

At the top of the heap is EMC Dantz's Retrospect Professional 7, our Best Buy. You can upgrade from the bundled versions of Retrospect Express 6.5 for $50, a bargain considering that version 7 costs $95 if you buy it off the shelf. Retrospect can back up open files. The Professional edition includes a host version and a client version, as well as two client licenses; you can use it to back up as many as three PCs via your host computer. The user interface's wizards are easy to follow, so long as you select the correct task first.

StompSoft's $60 BackUp MyPC 2005 is almost as powerful as Retrospect Professional and, with its wizards and Windows Explorer-like interface, is easy to use. It will back up to and from network drives, as long as they're mapped (though the license agreement says you can't use it over a network). BackUp MyPC 2005 can back up open files, too; however, unlike Retrospect Professional 7 it can't do backups using native file format, which reproduces your existing file and folder structure without applying a proprietary compression scheme.

TANAGRA'S Memeo backs up files as you change them.

NTI's $80 Backup Now 4 Deluxe has most of the same options as BackUp MyPC, but also provides a disk-imaging application for creating an exact duplicate of your hard drive. It organizes tasks into easy-to-follow steps, with buttons labeled '1', '2', '3', 'Start', and 'Schedule'. The software worked fine when connected to a USB or FireWire drive, but it froze for 30 seconds or so whenever we used a network drive.

You can set NovaStor's versatile $50 NovaBackup Professional 7.2 to run other applications before or after it conducts a backup—useful if, for example, you want to run a spyware check prior to backing up your drive. NovaBackup has a sleek interface, and its many customizable settings are simple to understand and follow. The software can back up to network drives, but like most backup apps NovaStor's license says you can run it on only one system; additional licenses cost $50 each. Another $56 add-on provides open file backup.

If you want to back up multiple computers on a network, CMS Products' $70 BounceBack Professional 6 ($49 upgrade from Express) is a steal, as CMS says you can

BUFFALO'S TeraStation offers high-capacity storage.

tests, it failed to copy multiple files because the file path was too long. Furthermore, if you enable compression, the software won't back up any file larger than 2GB—so forget about saving digital video files of even relatively modest size.

All of the network storage drives in this group have Web browser–based command centers that enable you to set up shared folders, mete out access privileges, and use disk-formatting utilities. The Western Digital NetCenter, the Buffalo LinkStation and TeraStation, and the Maxtor Shared Storage unit also have extra USB 2.0 ports, for sharing devices such as another hard drive or a printer.

Some of the drives are easier to use than others. Leading the way is the Adaptec, whose clear interface is speedy to navigate. Maxtor's and Western Digital's interfaces look surprisingly similar to each other, and they work well too, but their procedures are a little harder to follow than those of the Adaptec. The Maxtor unit has an added convenience if you also use the drive for shared network storage: Its software automatically sorts your files as you drag-and-drop them to the drive.

Buffalo's LinkStation has a sluggish Web interface, but the TeraStation's interface is quick—probably because the latter device has a 266-MHz PowerPC processor and 128MB of RAM inside. The TeraStation's management utility makes setting up user privileges easier than most of the other tools do.

Each of the drives here will work with either a fixed IP address or one ▶

install it on any computer that's using the same backup device—and even explains how to do so. The software lets you save multiple versions of your files and synchronize files between two systems. It does native file backups, and allows you to create a bootable hard drive—a boon if your PC supports booting from a USB device, or if you want to remove the hard drive from your backup device and swap it into your PC.

Tanagra's $30 Memeo 1.5 provides folder-monitoring capabilities. After the initial backup, it backs up new or changed files automatically, immediately, to almost any kind of backup device, including to an FTP server. It won't back up system files or program files, so it's inappropriate for full system backups.

Iomega's $70 Automatic Backup Professional 3.2 can perform full system backups, or back up just certain files. Like Tanagra's Memeo, it can monitor folders for new or changed files, and back up multiple versions of files. If your backup drive isn't available, the software will temporarily store any changed files until the target becomes accessible, even if it's a network drive. The software is easy to use, as well: For example, defining a network target for backup is simpler than with most of the other tools here.

TEST Center CLOSE-UP ON BACKUP

MOVE BEYOND YOUR bundled software with one of these backup utilities.

	BACKUP SOFTWARE	Bottom line
1	EMC Dantz Retrospect Professional 7 Best BUY $95 (★★★★☆) find.pcworld.com/48650	Full-featured app includes licenses for two clients. Can back up over a network as easily as to an internal hard drive; but it won't back up multiple PCs concurrently.
2	Iomega Automatic Backup Professional 3.2 $70 (★★★★☆) find.pcworld.com/48658	Has useful features like folder monitoring for automated backups, disaster recovery, and multiple options for different types of backups. Works easily with network drives.
3	NovaStor NovaBackup Professional 7.2 $50 (★★★★☆) find.pcworld.com/48656	Includes disaster recovery. Can start other applications before or after it backs up. However, to back up open files, you must buy an upgrade—which costs more than the app itself.
4	CMS Products BounceBack Professional 6 $70 (★★★½☆) find.pcworld.com/48662	Plain-looking utility offers native file backup, and you can install it on every PC on your network with CMS's blessing. Ability to create a bootable drive is a plus.
5	StompSoft BackUp MyPC 2005 $60 (★★★½☆) find.pcworld.com/48652	Performs many types of backup and is easy to use. Has no problems with network drives, and can back up open files. It lacks native file backup, however.
6	Tanagra Memeo 1.5 $30 (★★★½☆) find.pcworld.com/48653	Though this attractive utility does not perform system backups, it will monitor your files for additions or changes, and will automatically back them up as you go.
7	NTI Backup Now 4 Deluxe $80 (★★★☆☆) find.pcworld.com/48660	Works fine as long as you back up to a local drive, but it froze for long periods when we attempted to back up to a network-attached drive. Also includes a handy imaging utility.

CHART NOTES: All products support backup to multiple media types, including CDs, DVDs, and mass-storage devices such as external and network hard drives and flash-memory drives. All but Tanagra Memeo support full, incremental, and differential backups; and all but Tanagra Memeo support disaster recovery. Street prices are as of 6/25/05.

assigned by a router. Most of the drives require you to browse Network Neighborhood to map the device after you've connected it, but the Western Digital NetCenter asks if you want to assign it a drive letter during its software installation. If you're using one of these drives for backup, you'll need to map it to a drive letter: Backup software typically won't work with a networked drive unless you do so.

MIDDLING PERFORMERS

NOT SURPRISINGLY, none of the five chart makers burned up the pavement with their speed. The Buffalo LinkStation completed our system backup test in just under 48 minutes (with compression and verification turned off by default), making it the fastest of this group.

The Maxtor and the Western Digital came in second and third, respectively, both at about 56 minutes; however, each drive's default configuration had file verification turned on—without verification, either model may have won the heat.

The Buffalo TeraStation—which at $1 per gigabyte offers the best value of the bunch—has four internal 250GB ATA-100 hard drives that come configured to use the integrated RAID controller for disc spanning (but not for striping or mirroring). You can easily change the RAID configuration; the unit supports RAID 0, 1, and 5. Regrettably, this model's singular gigabit ethernet connection didn't yield a performance advantage, as it was on a par with the Maxtor and Western Digital models. The TeraStation came in first on our file-copy test—by a hair.

The Adaptec also has two drives, striped together using RAID 0 for greater speed but no data redundancy. Unfortunately, the unit's performance was unimpressive: Using the ancient Symantec DataKeeper software, with no verification or compression, it took about 65 percent longer to complete the system backup than the average of its tested competitors.

Direct-Attached Storage

HIGH-PERFORMANCE, high-capacity storage drives—such as the three direct-attached storage devices here—typically connect to a workstation or file server. Such devices offer high-capacity backup for multiple computers or redundant backup for one PC via multiple, easily removed drives and RAID, which provides high throughput and disk mirroring. Often, these devices even have a bay for an extra drive so that if one drive fails, the unit can automatically start rebuilding the failed drive onto the spare.

None of the products we evaluated in this category—LaCie's $2200 Biggest F800 (1.6TB), Silicon Image's $2200 SV2000 (800GB), and WiebeTech's $1400 RaidTech 800 (800GB)—includes backup software. All three have at least two RAID configurations; only the WiebeTech unit lacked a spare hot drive.

The most intriguing product in this group was the Silicon Image, which ▶

FEATURES COMPARISON

TEST Center NETWORK DRIVES BACK UP MANY PCs, SLOWLY

OUR BEST BUY, THE MAXTOR, is great for moderate storage needs; but Buffalo's TeraStation has capacity in spades.

	NETWORK-ATTACHED STORAGE	Specifications [1]	Performance (in min:sec)		Bottom line
			Copy files	Full backup	
1	Maxtor Shared Storage Drive Best BUY $350 (★★★½☆) find.pcworld.com/48637	• 300GB • 10/100Base-T ethernet; two-port USB hub • No backup software	9:23	56:10 [2]	Stylish device will work with any backup application you choose. Network setup is easy; USB 2.0 port on the rear lets you share a printer or an extra hard drive on the network.
2	Western Digital NetCenter $400 (★★★½☆) find.pcworld.com/48636	• 300GB • 10/100Base-T ethernet; two-port USB hub • No backup software	9:16	56:11 [2]	Slim box is very similar to the Maxtor drive, but is a little more expensive. Also includes a USB 2.0 hub for sharing supported printers and storage devices.
3	Buffalo TeraStation $1000 (★★★½☆) find.pcworld.com/48634	• 1TB • Gigabit ethernet; four-port USB hub • Buffalo Easy Backup to HD	8:51	57:06	Despite its use of RAID, this box showed little performance advantage over competitors; but it does offer the best value per gigabyte, plus an integrated print server.
4	Buffalo LinkStation 300GB $400 (★★★☆☆) find.pcworld.com/48632	• 300GB • 10/100Base-T ethernet; [3] one-port USB hub • Buffalo LinkStation Backup	9:01	47:44	Its performance is speedy, but its Web interface is slow. The minimalist software won't back up compressed files larger than 2GB. Can daisy-chain via the TeraStation's USB hub.
5	Adaptec Snap Server 2200 $1470 (★★★☆☆) find.pcworld.com/48628	• 500GB • 10/100Base-T ethernet • Symantec DataKeeper 5	11:33	90:02	Unit has an excellent Web interface and print server, and works with many operating systems. Accesses files via a browser or FTP. But this costly unit was slow in our tests.

FOOTNOTES: [1] All drives connect via USB 2.0, in addition to the listed ethernet. [2] We tested with EMC Dantz's Retrospect Professional 7, with data verification and compression disabled. [3] A version of the drive with gigabit ethernet will be shipping by press time. **CHART NOTES:** For copy files (and folders), we copied 3.06GB of data using Windows XP Explorer. For full backup, we tested all drives with the bundled backup software, with data verification and compression disabled, unless otherwise noted; 12.1GB of data was backed up. Street prices are as of 6/25/05.

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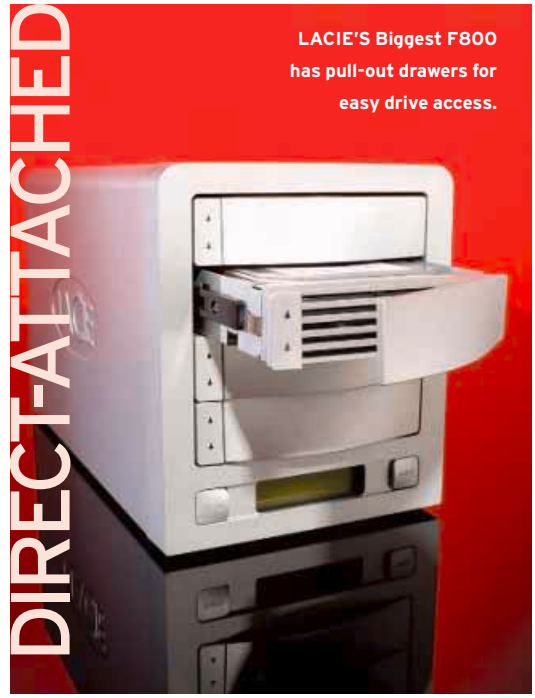
DIRECT-ATTACHED



LACIE'S Biggest F800 has pull-out drawers for easy drive access.

smoked the other direct-attached competitors—not to mention our entire field—when it came to speed. Connected to our test system via external SATA (using the included PCI SATA card), the Silicon Image finished our 3.06GB copy files and folders test in 1 minute, 18 seconds, a little over half the time of the next closest device, the WiebeTech. It completed our system backup in just over 11 minutes. The model's speed may not be due just to SATA: Since it has an on-board processor, it doesn't depend on the host PC's processor for its RAID processing.

The Silicon Image unit we tested had five 160GB hard drives: two configured as RAID 0 (striped, for performance); two more set as RAID 1 (mirroring, for data security); and a fifth set as a hot-pluggable spare. Swapping drives is easy: The pull-out carriers that hold them, and the levers that release them, work smoothly

All that redundancy left us with only 320GB of usable storage, however. You can change those settings easily through the device's plain-looking yet functional software management utility. The tool eschews the usual RAID levels, instead using clear terms like 'Big', 'Fast', and 'Safe' to describe its settings (the default configuration was 'Safe and Fast').

The WiebeTech we received for testing was set up as RAID 0, so it gave us access to all 800GB of its drive space (two 400GB ATA-100 drives). To change the RAID configuration, you simply flick a switch on the back of the unit and reformat. The device did well in our tests: Connected via USB 2.0, it finished our copy test in about 2.5 minutes and the system backup test in under 16 minutes. The drives are held by levers, which you can lock to prevent removal. To access the product's management utility, you must connect a serial cable or use the front panel's LCD.

LaCie's Biggest F800 has 1.6TB of capacity, with four 400GB ATA-100 drives set up as RAID 5. This setting is defined as data striping with parity, which means you get the number of drives minus one—in this case, 1200GB—of usable storage, and if a drive fails you can rebuild it on the fly. The unit also supports RAID 0, 1, 5, and 10; and it has drive carriers with curved handles so that you can easily remove and swap out the drives.

The LaCie finished our copy test in about the same amount of time as the network-attached devices did—a disappointing result considering it was connected via USB. It completed the system backup test about twice as quickly as the fastest network device did, but still took about 50 percent more time than the WiebeTech model. ■

Alan Stafford is PC World*'s senior writer.*

FEATURES COMPARISON

TEST Center BIG MODELS HAVE EASY-TO-SWAP DRIVES

ALL THREE DIRECT-ATTACHED DRIVES have slide-out trays and multiple RAID settings. The Silicon Image was fastest.

	DIRECT-ATTACHED STORAGE	Specifications	Performance (in min:sec)		Bottom line
			Copy files	Full backup[1]	
1	Silicon Image SV2000 $2200 (★★★★½) find.pcworld.com/48624	• 800GB • External SATA (PCI card included) • Supports RAID 0, 1, 10, and JBOD	1:18	11:13	The undisputed winner in our copy files (and folders) test and our system backup test, this flexible unit is aided by its external SATA connection. Too pricey to get our Best Buy, though.
2	WiebeTech RaidTech 800 $1400 (★★★★☆) find.pcworld.com/48622	• 800GB • USB 2.0, FireWire 800, FireWire 400 • Supports RAID 0, 1	2:26	15:53	Its two 400GB drives striped together using RAID 0 provided very fast performance in our tests. But its lack of expansion and limited RAID options make it a bit pricey.
3	LaCie Biggest F800 $2200 (★★★☆☆) find.pcworld.com/48626	• 1.6TB • USB 2.0, FireWire 800, FireWire 400, RS-232 • Supports RAID 0, 1, 5, 5 plus hot spare, 10	8:57	23:39	This device has massive capacity, all right—and the lowest cost-per-gigabyte in this category. But in our copy files test, it performed more like a network drive.

FOOTNOTE: [1] Drives don't ship with backup software; we tested with EMC Dantz's Retrospect Professional 7, with data verification and compression disabled. **CHART NOTES:** For copy files (and folders), we copied 3.06GB of data using Windows XP Explorer. For full backup, our backup file was 12.1GB. Street prices are as of 6/25/05.

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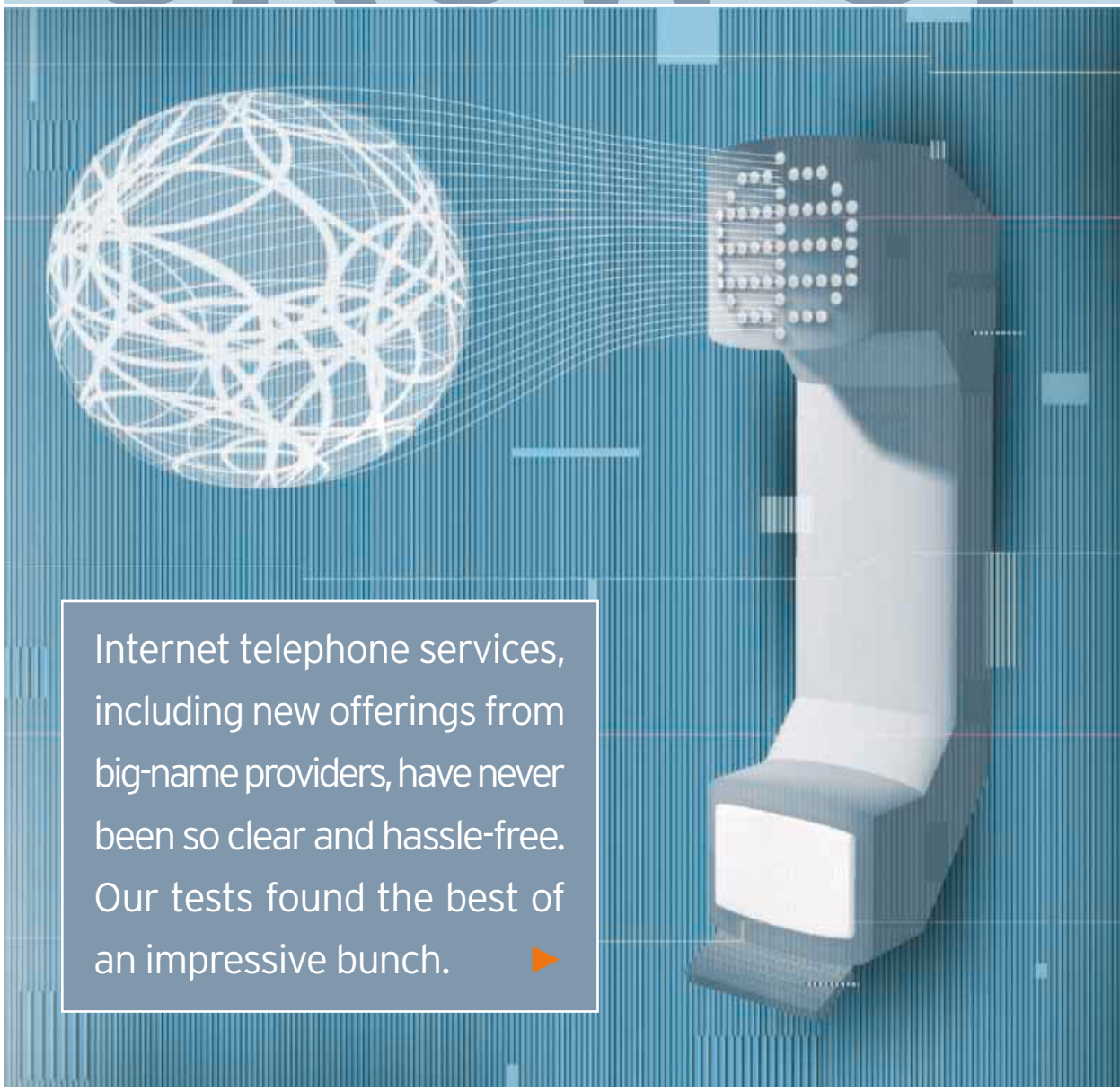

Internet telephone services, including new offerings from big-name providers, have never been so clear and hassle-free. Our tests found the best of an impressive bunch. ▶

BY JEFF BERTOLUCCI • ILLUSTRATIONS BY JOHN HERSEY

A LOT HAS CHANGED since we last tested Internet phone services 16 months ago ("Internet Phones: Clear Winners," May 2004; find.pcworld.com/43406). The Internet phone market, once the domain of scrappy startups like 8x8 and Vonage, has been invaded by telecommunications giants such as Comcast, Verizon, and—yes, Ma Bell herself—AT&T.

Simply put, Net phones are hot. Why? For consumers and small businesses, the price is right. An Internet phone service plan permitting unlimited calls to the United States and Canada costs as little as $20 per month, less than half of what you'd pay for a comparable landline plan.

We're not quite ready to ditch our landline phones, as VoIP still has some serious issues to resolve: problems with 911 service (see "E911: Coming to a VoIP Phone Near You" on page 106), installation hassles, power outages, dropped calls, and garbled and clipped sentences. Still, Net phone technology has improved dramatically since May of last year. We had far fewer setup problems this time around—installation woes are more the exception than the rule—and call quality showed marked improvement, approaching landline quality in many cases (except on weeknights, when Internet traffic tends to be busiest).

For the uninitiated, a brief primer: Internet phones work via your cable, DSL, or T1 broadband connection. They convert voice into data packets and route these packets over the Internet to a landline or cell phone (via a circuit-switched gateway) or travel the Net exclusively, if the person you're calling has the same service provider (Vonage-to-Vonage, for instance).

Unlike PC-based phone services such as Skype (see "Skype: Sorting Through the Hype" at right), Net phones don't depend on a computer to operate. You simply plug your home phone into a terminal

Online: MORE ON PCWORLD.COM

WANT TO LEARN MORE about VoIP? Head to PCWorld.com. You can read a review of Net2Phone's Wi-Fi handset (pictured at left) at find.pcworld.com/48922. This device lets you access your Net phone service from your favorite wireless hotspot. While on the site, be sure to check out our VoIP Info Center (find.pcworld.com/48920) for the latest news and for even more reviews.

PHOTOGRAPH: RICK RIZNER

REPORT CARD

Internet Calling Plans: HOW THEY COMPARE

AT&T CALLVANTAGE offers landline-quality audio, but in our tests we found that most other providers were similarly reliable—

	INTERNET PHONE SERVICE	Equipment required; price	Monthly payment plan	911 service	International call charges
1	AT&T CallVantage (★★★★☆) Best BET www.callvantage.att.com	Centillium, D-Link, or Linksys adapter; $30 (covers activation fee)	Unlimited calls to the U.S. and Canada for $30	E911 included	From 4 cents/minute (Guam) to $1.51/minute (Wallis and Futuna Islands)
2	8x8 Packet8 (★★★½☆) www.packet8.com	Packet8 BPA 410 adapter; free from Packet8's Web site	Unlimited calls to the U.S. and Canada for $20 after $30 activation fee	E911 for $1.50 per month	From 3 cents/minute (UK) to $12.29/minute (Iridium satellite phone)
3	Comcast Digital Voice (★★★½☆) www.comcast.com	Comcast adapter; leased for $3 per month	Unlimited calls to the U.S. for $55; $45 with one additional Comcast service; $40 with both Comcast Cable and Comcast High-Speed Internet	E911 included	From 5 cents/minute (Canada) to $4.99/minute (Thuraya satellite phone)
4	Vonage (★★★½☆) www.vonage.com	Linksys adapter; no charge	Unlimited calls to the U.S. and Canada for $25 per month	E911 in some service areas	From 3 cents/minute (UK) to $13.44/minute (Universal Personal Telecommunications)
5	Verizon VoiceWing (★★★☆☆) www.verizon.com/voicewing	Linksys adapter; no charge	Unlimited calls to the U.S. for $35 per month	E911 in some service areas	From 1 cent/minute (Canada) to $18.80/minute (Indian Ocean)
6	AOL Internet Phone Service (★★★☆☆) www.aol.com/product/voip.adp	Linksys or Netgear adapter; no charge	Unlimited calls to the U.S. and Canada for $40 per month (fee includes charge for AOL service)	E911 included	From 4 cents/minute (Guam) to $19.31/minute (Iridium satellite phone)
7	Lingo (★★★☆☆) www.lingo.com	Primus adapter; $10 shipping charge	Unlimited calls to the U.S., Canada, and Western Europe for $20 per month after $30 activation fee	Basic 911 (must upgrade to E911 by FCC deadline)	From 3 cents/minute (UK) to $4.25/minute (Inmarsat satellite network)

adapter provided by your VoIP vendor (or into one you've bought at an electronics retailer such as Best Buy or Circuit City) and plug the adapter into a broadband modem/router. You can arrange to receive a terminal adapter when you sign up for service at a VoIP vendor's site, or you can buy an installation kit at retail.

PUT TO THE TEST

WE TESTED SEVEN Internet phone services, from the Davids and the Goliaths of the industry: AOL Internet Phone Service, AT&T CallVantage, Comcast Digital Voice, Primus's Lingo, 8x8's Packet8, Verizon's VoiceWing, and Vonage.

In our tests over the course of a month, the most impressive service was AT&T CallVantage (soon to be owned by telecom behemoth SBC). Call it Ma Bell's revenge if you will, but CallVantage delivered the best call quality around the clock. We made dozens of calls with CallVantage, often while downloading or uploading large files, and encountered just one instance of a (barely perceptible) echo.

That said, no VoIP service is perfect. The first adapter that AT&T CallVantage sent us (a Linksys model) didn't work with our router. After spending a couple of days trying to get the Linksys adapter to work, AT&T tech support sent us a D-Link adapter, which worked perfectly.

This problem was the biggest setup headache that we encountered. We installed AOL, Packet8, and Vonage without a hitch; Lingo and Verizon VoiceWing required only brief calls to tech support; and a professional installer configured Comcast Digital Voice for us.

Every provider delivered reliable call quality, aside from an occasional glitch. AOL's service was great during the day, but it suffered from clipped sentences ▶ despite occasional glitches that cropped up.

	Setup/ Ease of use	Voice quality and reliability	Web features	Fax support	Comments
	Fair/ Excellent	Excellent	Account management, call logs, voice mail	Yes	Excellent call quality, fine collection of features, and a good price. We did have some problems with setup, but AT&T's tech support solved them.
	Excellent/ Good	Excellent	Account management	No	Excellent call quality and low price. Unfortunately, the service lacks fax support and Web-based voice mail, and tech support needs work.
	Good/ Excellent	Good	Voice mail	Yes	Superb call quality, but the service is pricey unless you get it as part of a Comcast bundle. Web features are minimal but more are promised.
	Excellent/ Good	Good to Fair	Account management, call logs, voice mail	Dedicated line $10/month after $10 activation fee	Good call quality, but occasional garbling and clipped sentences during weeknight calls. One night, repeated efforts to call abroad failed.
	Fair/ Good	Good	Account management, call logs, voice mail	Yes	Good call quality with occasional slight echoes. No call problems while Web surfing. Nicely organized Web site. Fax support is a bit clunky.
	Good/ Good	Good to Fair	Account management, call logs, voice mail via AOL software	No	Good call quality overall, but occasional garbling and clipped sentences, notably in the evening during long-distance or international calls.
	Fair/ Good	Good to Fair	Account management, call logs	Yes	Good call quality with occasional garbling and clipped sentences. Free calls to Western Europe, but lacks E911—and must provide it soon.

Skype: SORTING THROUGH THE HYPE

CAN 42 MILLION users be wrong?

That's how many people worldwide have installed Skype, a free PC-to-PC phone service that (for a fee) will also make and receive calls to and from conventional telephones.

Skype isn't a true alternative to a desktop phone. It's a software-based service that runs on Linux-, Mac-, and Windows-based systems. It requires a broadband connection and a headset.

The service is easy to use. A pop-up message notifies you when one of your Skype contacts is online, and you can initiate a phone call with a single click.

Skype is free only when used to make a PC-to-PC call to another Skype user, but users can be located anywhere in the world. We found the audio acceptable, though hardly of landline quality: We noticed some clipped sentences, yet voices were audible.

Calling a conventional phone from Skype using the SkypeOut service—which lets users make calls to landline, cell, and VoIP phones—is a different story. We experienced low volume, clipped sentences, and garbling.

Skype also offers a service called SkypeIn, which assigns you a regular phone number. People who don't use Skype can call this number, and the call will be routed to your Skype account.

Despite our grumbling, we like Skype. It's free, fast, and great for calling other Skype users, especially internationally. But keep your primary phone, please.

and garbling during long-distance weeknight calls, particularly when we simultaneously downloaded video. Verizon calls came with soft echoes from time to time, and Lingo and Vonage conversations had some clips and garbles during evening hours. Comcast and Packet8 delivered great audio quality; but Comcast's service is relatively expensive (see the chart), and Packet8's package lacks fax support.

Is there an advantage to going with a big-name VoIP vendor? Not necessarily. AT&T, our Best Buy, is a big name—but Packet8 calls were clearer than Verizon VoiceWing calls, proving that the little guys can provide winning service, too.

DUMP THE LANDLINE?

IP TELEPHONY still has reliability issues. For one thing, if your broadband connection fails, so does your phone service. And if the power goes dead, your phone is out of order. (Not always, though: Comcast's adapter comes with a backup battery.) If you need to call 911 during a blackout, a flood, an earthquake, or some other emergency, a Net phone may be of little help.

On the other hand, VoIP does have perks. Customers can select any area code they want, regardless of their geographical location. And VoIP phones aren't tied to a home or office. You can call from a hotel or from halfway around the world—anywhere you can jack into high-speed Internet.

Businesses stand to benefit from VoIP, too. For instance, Packet8's Virtual Office, a $40-per-month Internet-based phone system, allows an unlimited number of staff extensions, even if the staffers are in a different city or continent. AT&T, Lingo, and Vonage have $50-per-month business plans with a fax line and unlimited calls to the United States and Canada. Lingo offers free Western Europe minutes, too.

One thing's for certain: The Internet is unmistakably the future of telephony. ■

MOST VOIP PROVIDERS SUPPLY online extras—allowing you to visit a Web site to listen to voice mail, view call logs, and configure account settings. But the sites vary in quality: AT&T's Web site is nicely laid out and easy to navigate, whereas Packet8's site is too bare-bones and doesn't offer access to voice mail.

Jeff Bertolucci is a California-based freelance writer. Tom Kortie of Indianapolis contributed testing to this article.

E911: COMING TO A VoIP PHONE NEAR YOU

GOOD NEWS: Soon VoIP service vendors must provide 911 service that rivals the emergency service offered to landline users. A May 2005 Federal Communications Commission ruling ordered IP phone companies to provide enhanced 911 (E911) service in place of basic 911. VoIP companies must comply with the FCC ruling by November 28.

Basic 911 emergency networks can't determine a caller's location or telephone number, meaning that you must provide this information to a call taker—no easy task in some emergencies. And that's if your call goes through at all. Earlier this year, Vonage customers in several states sued the VoIP vendor for failing to warn them of shortcomings in their 911 service. In one case a Texas woman tried to dial 911 from her Vonage phone during a home invasion. Her call connected to a recording announcing that no emergency access was available from that line. Vonage says that it's rapidly upgrading its network to E911, and it hopes that it will have completed the process by the end of 2005.

With E911, emergency calls go directly to a public service switchboard in your area; your address and phone number are automatically reported to emergency responders.

One potential issue with E911 service is its cost. "E911 costs will be passed along directly to customers," says Yankee Group senior analyst Brian Partridge. "I've heard estimates of $2 to $5 per customer [per month] for E911. And that's a mandatory part of service, not an option." None of the VoIP companies we approached for this story would comment on whether it will raise its rates in light of the FCC's ruling.

If your VoIP provider does not yet offer E911, you can still keep yourself safe. Most important, make sure that your provider has your current address (to pass along to E911), and always keep emergency numbers for your local police and fire departments handy. Even when your VoIP provider begins offering E911, the service is not automatic. To get it, you must register your street address with your VoIP provider, and update the address if you move.

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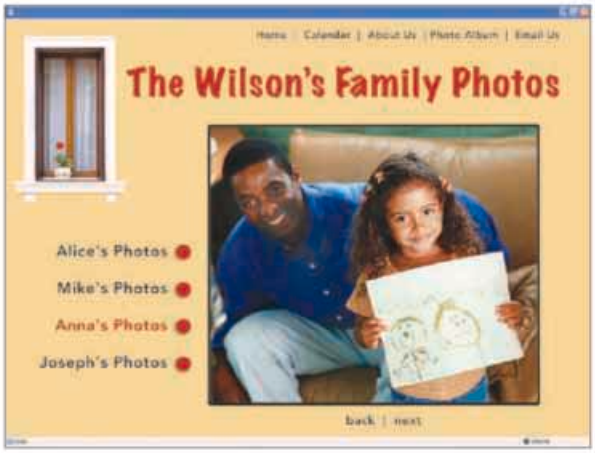

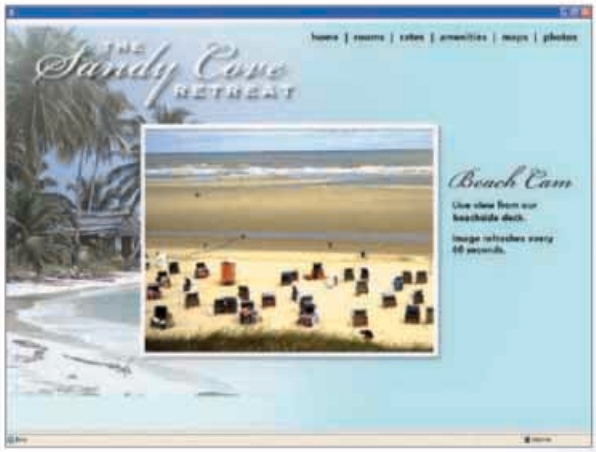

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PHOTOGRAPH: CHIP SIMONS

THE CABLE GAME

SALESPEOPLE MAY TELL YOU THAT EXOTIC VIDEO CABLES DELIVER A BETTER PICTURE. BUT THE RESULTS OF OUR EXCLUSIVE LAB TESTS COULD SAVE YOU MONEY. BY SEÁN CAPTAIN

YOU COULD SPEND $20 or less for a cable to connect your DVD player or cable box to your television—or you could spend hundreds. But how do those cables differ?

While conventional wisdom says a wire is a wire, a poorly constructed cable can seriously degrade video quality. Used with a digital connection, a bad cable can mangle pixel data, resulting in a speckled image; with an analog link, it can distort the signal, resulting in faded colors or blurred details. So the question is not whether a good cable is essential, but whether you need to spend a lot to get a good one.

To find the answer to that question, the PC World Test Center evaluated analog and digital video cables from five vendors: budget-cable companies CableWholesale.com and Startech.com, industry leader Monster Cable, and boutique brands AudioQuest and Kimber Kable. For analog connections, we tested the three-wire component-video cable—the only common analog interconnect that can carry high-definition TV or progressive-scan DVD signals. For ▶

HDMI CABLES: We tested cords from AudioQuest (top), Kimber Kable, Monster Cable, Startech.com, and CableWholesale.com.

digital connections, we used High-Definition Multimedia Interface (HDMI), which carries digital video and audio signals (though we tested only the video portion).

Prices for the component cables ranged from $18 (CableWholesale.com) up to $275 (AudioQuest). The HDMI cable prices ranged from $31 (CableWholesale.com) to $300 (Monster Cable). And since cable length is an important factor in testing—each additional foot has the potential to worsen the signal—we chose cables that measured about 4 meters (12 to 15 feet) each, long enough for the majority of home theater setups.

TESTING TACTICS

JUDGING CABLE quality by eye is tricky. It's hard to know, for example, whether a problem stems from the cable, the TV, the signal source (such as a DVD player), or the content. But a signal analyzer can isolate the cable from the mix and measure its ability to transmit data. Video generators produce top-quality images for diagnosing problems such as incorrect colors or blurriness.

We began our evaluation by checking the cables on precision test equipment. Then we used generators to send pristine video signals through the cables so we could view the results on TVs. We tested at least two cables of each model examined. Some cables came to our test center direct from the vendors; others, we bought.

All cables are designed to transmit signals well, but certain tests can be used to determine how well an individual model performs. For the digital cables, we tested the three color components, the copy protection signal, and the device identification—all parts of the HDMI specification. In the case of analog cables, we measured impedance, return loss, and insertion loss.

Our conclusion: You don't need to spend a fortune on cables. The HDMI cables performed comparably in both our instrument tests and our visual tests. And with analog cables, the analyzer revealed some degree of variation in quality, but the variances did not translate into noticeable differences in our visual tests.

DIGITAL PERFECTION

DIGITAL technology promises to transmit a perfect signal nearly all the time, thanks to the exacting standards incorporated in the HDMI specification. HDMI Licensing, which oversees the HDMI spec and ensures that companies comply with it, requires that no more than one pixel per billion be lost in transmission. "Even if you lost one out of a *thousand* pixels, you wouldn't notice it," says Leslie Chard, HDMI Licensing president.

To see for ourselves, we first used Quantum Data's 802BT Signal Generator/Analyzer to determine each cable's ability to handle video at resolutions of 480 progressive, which DVD players use; 720 progressive, popular among HDTV stations; and 1080 progressive, a possible format for future high-definition DVD discs and HD broadcasts.

We ran these resolutions at the 1.0-volt signal standard that HDMI sources (such as DVD players and cable set-top boxes) should provide. But we also challenged the cables with less-than-ideal voltage levels, ranging from an anemic 0.15 volt (to simulate a weak signal) up to an overdriven level of 1.56 volts. All but one cable performed well down to 0.15 volt and up to 1080 progressive for the main video signal elements: sync and InfoFrames (which allow the source and the TV to maintain a proper connection), plus three components that carry color or brightness information. Even the exception—a 4.5-meter AudioQuest HDMI-X cable that we purchased at Best Buy—would work fine in real life, where sources are more powerful than 0.15 volt and current resolutions are less demanding than 1080p. (Two other HDMI-X cables from AudioQuest performed well.)

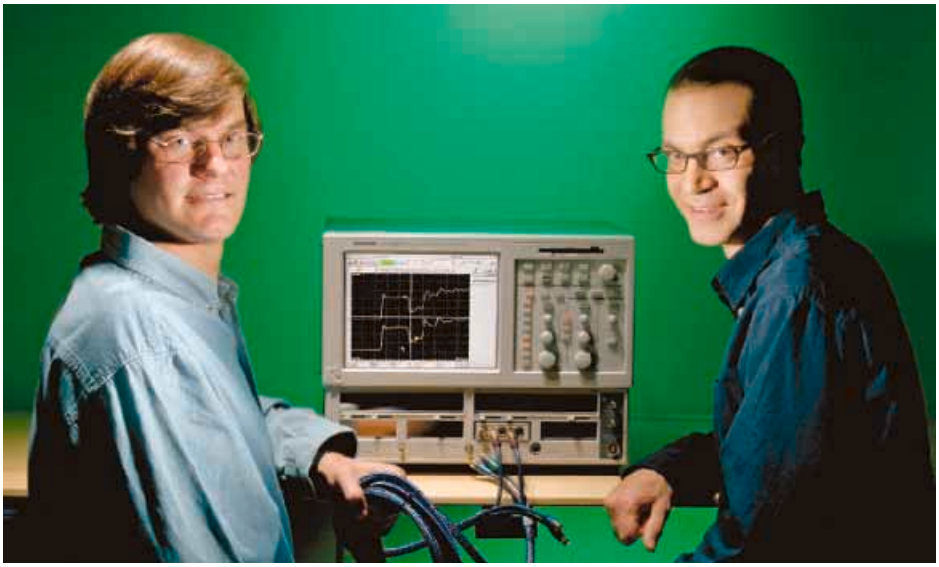
All of the cables, however, had some trouble when we degraded the high-definition copy-protection signal, a dialogue between the source and the display that is required for decrypting copy-protected material. If the HDCP information isn't transmitted, the device won't deliver a signal. Every cable we tried failed to transmit the HDCP data at between 0.32 and 0.29 volt as we progressively lowered the voltage in our test setup. You're unlikely to encounter a signal as weak as that, however.

REAL-WORLD DIGITAL

NEXT WE USED the Quantum Data 802BT to generate 720p test patterns and send them to an Epson PowerLite Cinema 500 LCD projector—a $5000 model that displays crisp high-definition signals in their native resolution of 1280 by 720 pixels, without scaling the image to higher or lower resolutions and thereby introducing artifacts. If the cables we tested could handle video signals specifically designed to illustrate problems, they could handle *The Aviator* or *Lost*.

We used a number of tests, including ramp screens, which present a smooth horizontal progression from black to full brightness. In viewing 720p ramps for gray, red, green, and blue, we looked for blink-

PHOTOGRAPHS: MARC SIMON



SENIOR PERFORMANCE ANALYST Jeffrey Kuta (left) and author Seán Captain use a Tektronix TDS8200 to measure cable properties. The device displays results in graphical form, making them easier to evaluate.

ing or incorrectly colored pixels. Blue speckles appearing on a red ramp, for instance, would have indicated that the cable had delivered incorrect data; with real video, such errors might translate to colored flecks in shadows. But all the cables, including the AudioQuest HDMI-X one that had some difficulty in our instrument tests, had no problems.

One obstacle we did face involved establishing solid connections with our devices' HDMI ports. In some cases, we connected the cable but no image appeared. Sometimes wiggling the cable fixed the problem, and sometimes it didn't. But the trouble seems to stem from the the standard HDMI connector design used by all cable vendors.

"If you jiggle an HDMI connector, one or two electrical lines in the connector might have intermittent connections," says Chad Nelson, an engineer with Maxim Integrated Products, which manufactures chips for digital and analog signaling.

"We don't believe that there is a fundamental problem with the design of the HDMI connector," says HDMI Licensing's Chard. However, he notes that his organization is evaluating proposals for a connector that latches in place.

For now, the best strategy is to position the cable carefully so that it applies no stress to the connector. In our tests, we had the most trouble when trying to attach Monster's $300 M1000HDMI cable to the Epson's HDMI port. Easily the thickest, stiffest, heaviest model we reviewed, the Monster cable pulled away from the projector's HDMI port, often causing the screen to go blank.

DIGITAL RELIABILITY

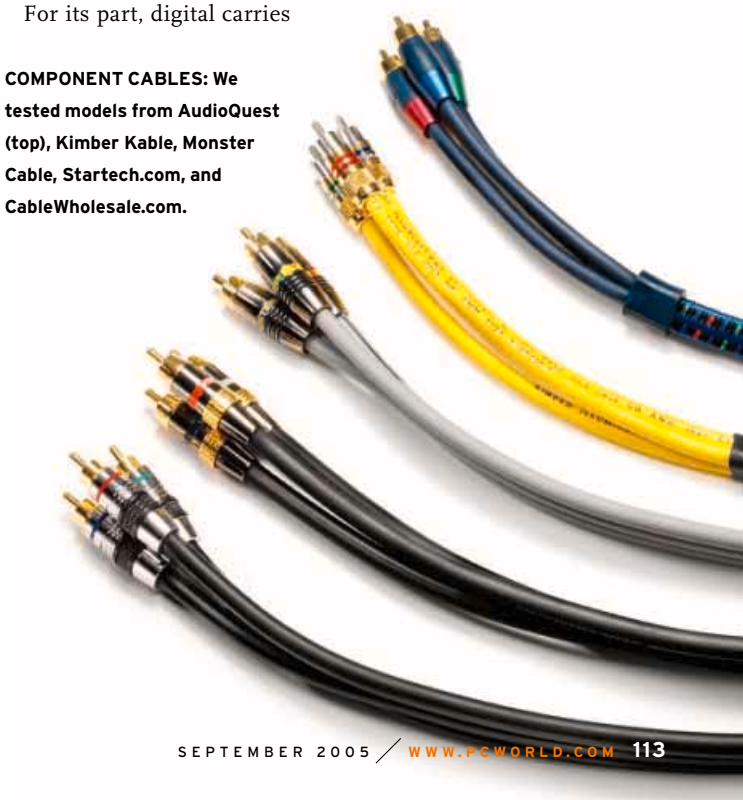
ONCE YOU get a good HDMI connection, our tests indicate, you can expect flawless performance from any 4-meter cable, regardless of price. "That is what I would expect from the HDMI cables," says Maxim's Nelson. "It is not too difficult to make them work perfectly at 4 meters."

Digital cables are inherently more dependable than analog ones. Both transmit data by controlling the voltage levels in an electrical signal. With analog, slight shifts in voltage correspond to precise values in the final picture. Thus, if the signal carrying blue color information loses voltage as it travels down the cable, the blue objects on screen will appear weaker than intended. (Think faded skies.)

For its part, digital carries just ones and zeros. In HDMI, if the signal voltage is high, it encodes a one; if low, a zero. The voltage encoded as a one can drop a fair amount and still be distinguishable from voltage encoded as a zero. After a certain point, however, the signal voltage drops so low that ones and zeros look alike, and the TV's receiver chip attempts to guess their value. So rather than gradually diminishing in accuracy, the way an analog signal does, a digital signal may remain perfect up to a critical level and then fail catastrophically. According to the experts, such problems are likelier to occur with an 8- to 12-meter copper cable (which is significantly longer than most users need) than with a 4-meter cable of the same type.

THE ANALOG STORY

SOMEDAY EVERY TV connection will be digital. But today, because many people still have devices that use analog connectors, they must con- ▶



COMPONENT CABLES: We tested models from AudioQuest (top), Kimber Kable, Monster Cable, Startech.com, and CableWholesale.com.

tend with some signal loss and distortion. So do expensive cables help reduce such problems? To find out, we tested our cables on the Tektronix TDS8200 Digital Sampling Oscilloscope, and then we analyzed them with the company's IConnect 3.5.1 waveform analysis software.

We started by measuring characteristic impedance—the extent to which a cable hinders the flow of a signal. The standard impedance for each wire in a component-video cable is 75 ohms. If the impedance in any one wire is far off the mark, it produces an impedance mismatch with the devices it connects to; as a result, some of the signal may be lost in transmission, or it may bounce back along the cable to the source, producing smeared colors or blurriness in the picture's fine details.

Monster's M500CV was the winner here, as all three wires inside the cable varied within a negligible 1 ohm of 75 ohms. Translation: This cable imposes as little distortion as possible. Other cables didn't do as well. The three wires included in the CableWholesale.com cables hovered between 63 and 64 ohms, while the Kimber Kable's wires measured between 85 and 86 ohms. The AudioQuest's wires varied from about 71 to 75 ohms. And the Startech.com's varied from about 67 to 69 ohms.

But here's the rub: Virtually every consumer component cable uses RCA-style jacks. Originally used for analog audio connections, RCA plugs have an impedance of about 50 ohms, creating unavoidable impedance mismatches at both ends of a cable. How well a cable manages the impedance at every point of the cable, not just at the connectors, affects its performance. But the impedance mismatch between a cable's wires and its RCA connectors has far more impact on performance than any other attribute.

We next calculated return loss, a measure of how much of the signal bounces back down the cable. According to the experts at Tektronix we consulted, 14 decibels is ideal. CableWholesale.com's product exhibited the least amount of signal bounce in our tests, at 13 decibels. The other four brands did worse (all at about 8 decibels). The Tektronix experts explained to us that practically all signal bounce is a result of the impedance mismatch between the wires and their RCA connectors.

We conducted one final test: Insertion loss, measured in decibels, gauges how much of the video signal gets lost as it runs through the cable. Four of the cables managed roughly equivalent performance. The worst performer in the group, the Kimber Kable V21, lost less than 2 decibels—an insignificant amount.

EYEBALLING ANALOG

SO WHAT DOES ALL of this mean in a real-life setting? Not much, we discovered.

Working with an AccuPel HDG-3000 HD/SD/DVI Component Video Calibration Generator, we sent 720p test patterns through our cables to the Epson PowerLite 500 projector. None of the cables transmitted a perfect signal, but the imperfections were minor. In crosshatch patterns (a grid of fine horizontal and vertical lines), some lines displayed slightly smeared edges or shadows, rather than sharp pixel-for-pixel transitions from white to black. But we had to get within a foot of the screen to see any of this, and we saw the same problems regardless of which cable we used.

Another set of test screens displayed multiburst patterns, featuring several swaths of parallel vertical lines that get progressively finer from left to right. On every screen, the finest swath—where the lines were just a single pixel wide—looked blurry for each cable, indicating that even a good display might smear small details. The other swaths were sharp, with well-defined transitions, regardless of the cable.

Bottom line: Though the analog cables varied slightly in our instrument tests, they did not produce distinguishable differences in transmitting real video content.

THE BIG PICTURE

WHETHER YOU hook up your TV via digital connections, analog connections, or both, you are unlikely to detect any difference in picture quality between a cable with a moderate price and a luxury brand. The only difference you're likely to notice is how the cable looks behind your TV. ■

Seán Captain is a freelance technology journalist. Senior Performance Analyst Jeffrey Kuta of PC World *conducted all testing. Special thanks to Pixelworks, Quantum Data, Tektronix, the Imaging Science Foundation, Silicon Image, Rohde & Schwarz, Pioneer Electronics, Epson, Denon, and Audioholics.*

PHOTOGRAPH: RICK RIZNER

PRICE COMPARISON

Cable Confidential

PRICES VARY FAR more than performance does.

	CABLE	Length [1]	Price
DIGITAL HDMI	AudioQuest HDMI-X find.pcworld.com/48492	4.5 meters	$183
	CableWholesale HDMI-01115 find.pcworld.com/48494	15 feet (4.57 meters)	$31
	Kimber Kable HD19 find.pcworld.com/48496	4 meters	$146
	Monster Cable M1000HDMI-4M find.pcworld.com/48497	4 meters	$300
	Startech HDMIMM15 find.pcworld.com/48498	15 feet (4.57 meters)	$64
ANALOG COMPONENT	AudioQuest YIQ1-1 find.pcworld.com/48499	4.5 meters	$275
	CableWholesale 10R4-03112 find.pcworld.com/48500	12 feet (3.66 meters)	$18
	Kimber Kable V21 RGB find.pcworld.com/48501	4 meters	$265
	Monster Cable M500CV-4M find.pcworld.com/48502	4 meters	$150
	Startech CPNTHQ12 find.pcworld.com/48503	12 feet (3.66 meters)	$42

FOOTNOTE: [1] All cable lengths are as close to 4 meters as could be purchased from each vendor. First number listed is the length advertised on the package.

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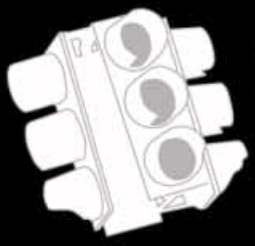

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DIGITAL AUDIO

SURROUND SOUND IN A BOX

SKEPTICS MIGHT DISAGREE, BUT IT'S POSSIBLE TO GET GREAT SOUND FROM A ONE-BOX UNIT. THESE FOUR OPTIONS SAVE SPACE AND REDUCE HASSLES. BY KALPANA ETTENSON

SURROUND SOUND, from one device, without the hassle of setting up multiple speakers and stringing wire around the house...is it possible? Certainly. For people who love music and multimedia audio but lack the time and patience required to set up a sophisticated surround-sound home theater system, the following four products provide an intriguing, and simple, alternative. Each works differently: One enhances the audio your connected devices generate to simulate surround sound on your devices' existing speakers, while the others contain multiple speakers (in a single box) that boom out the sound. Despite the different methods they use, each lets you achieve louder, better audio, whether you're watching the news, enjoying an action movie, or listening to a classical CD.

Xitel Soundaround

INCORPORATING principles of psychoacoustics, the Soundaround is supposed to trick your brain into hearing surround sound by delaying and varying the intensity of the audio that your TV's or stereo's main speakers emit. This petite device, 5.8 inches wide by 1 inch high by 4.7 inches deep, has one set of coaxial analog audio inputs and outputs for connecting it to a television, DVD player, PlayStation 2, Xbox, satellite or cable set-top box, or digital video recorder. You simply plug the supplied standard audio cables from the component you're using into the Soundaround box and then connect the box to your television or stereo.

The unit definitely works: Audio from a TV or from stereo speakers was enhanced, with greater detail and nuance. But the sensation of hearing actual surround sound was absent, and the audio was certainly less powerful than you'd expect from a true multichannel speaker arrangement. Still, the Soundaround's easy setup, included remote control, simple operation, and moderate effectiveness make this product worth the money for undemanding audio types who want to invest a little in their home stereo system.

Zvox 315 Sound Console

THE ZVOX ENHANCES the audio from your television, DVD player, or PC by incorporating three speakers plus a subwoofer in its 17-by-4.5-by-14-inch box. The Zvox's proprietary PhaseCue circuitry lets you control out-of-phase information via a knob on the rear: Turn it lower for normal sound or higher to create the illusion of surround sound. Ideally you would position the Zvox on ▶

PHOTOGRAPHS: MARC SIMON

top of or underneath your TV, like a center-channel speaker; hooking it to a television with variable audio outputs is best, so you can use your TV remote to control the volume. If you hook the Zvox to a DVD player, you'll need to adjust the volume using the controls on the back. Their rear placement can hinder adjustment; but once you've set the volume at the right level, you should not have to touch the knobs again. Basic TV shows and DVD movies sounded great, with loud tones, easier-to-hear dialogue, and booming bass. The Zvox certainly pales in comparison with a standard multipiece surround-sound setup. But if you want to add oomph to your audio, the Zvox is a great, affordable option.

M&K MP-4512

UNLIKE THE other one-box units here, the MP-4512 has to be hooked up to a surround-sound A/V receiver. The MP-4512 houses five speakers inside its 17-by-5-by-5.5-inch box. These include individual speakers for the left, center, and right channels, along with two side-mounted speakers intended to project surround effects left and right. You'll need to provide the cables to hook the MP-4512 to your receiver. Audio delivered by the MP-4512 sounded superb. Dialogue was crisp, and we had no trouble discerning high and low tones. In fact, the audio sounded as if it were being generated by more than one five-speaker unit—you could easily blast the volume and enjoy the results. The downside: The MP-4512 lacks a subwoofer, though M&K sells various separate subwoofers that work with it. If you are willing to spend a little extra for great audio, and you don't want lots of wires crisscrossing your living room, the MP-4512 will deliver in spades.

Yamaha YSP-1 Digital Sound Projector

SURE IT'S EXPENSIVE, and yes, you could spend the same amount on separate speakers, but why do that when you can get everything you need in a single unit? The sleek and stylish YSP-1, which measures 40.5 by 7.6 by 4.6 inches, incorporates Dolby Digital and DTS decoding, as well as Dolby Pro Logic II and DTS Neo:6 surround-sound processing; it also supplies its own moderately powerful internal amplification, so you don't need to connect it to a receiver. You simply hook it up to a TV (analog or digital), a DVD player, a cable or satellite receiver box, or a VCR to get stellar sound. Yamaha provides all the cables you need, as well as a remote control. The YSP-1's 40 little speakers and 2 midrange speakers project the sound such that it bounces off nearby surfaces. As a result, when the device is situated properly (underneath your TV, ideally, though you can mount it on a wall), it delivers high-grade surround sound.

The YSP-1, unlike the other devices we discuss here, presents you with a setup that's far from simple—but in this case that's a good thing. It requires you to select your room size, and then it calibrates the sound accordingly. You can also program it according to your room's exact specifications. The final result: amazingly strong, vibrantly clear sound that conveys the distinct impression of coming from several speakers. The YSP-1 does not include a subwoofer, so bass tones were not strong. Nevertheless, this is a great unit for the style-conscious, and audiophiles will likely be mighty impressed, too. ■

Kalpana Ettenson is a senior editor for PC World.

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GADGET FREAK

DAN TYNAN

I've Been to the Mountin' Top: Tips for Hanging Your HDTV

SHOPPING FOR A big flat-panel HDTV is easy. Paying for it is a little more complicated. But the true challenge is figuring out where to put it once you get it home.

You can take the coward's way out and stand the TV set on a solid piece of furniture in your family room. Or you can take the manly route and mount that sucker to the wall. For that I'm-so-cool aesthetic, nothing beats a wall mount.

Feeling manly? Good. Here is what you need to do.

Get the right tools: You'll need a tape measure, a drywall saw, a power drill, and a stud finder—an electronic gadget that helps locate the wood framing in your walls. You have to screw the mount into the studs; otherwise, your flat screen might end up flat on the floor. Get a buddy to help you hoist the set, as a 42-inch plasma TV can weigh 70 pounds or more. I'd also recommend a bottle of Motrin, a flask of bourbon (for courage), and a thorough review of your homeowner's insurance.

Select your mount: This is not the place to get cheap. If you have a 42-inch plasma set, plan on dropping at least $200 on a fixed mounting kit or about $250 for one that tilts, says David Slavitt, owner of Audio Video Solutions (www.avsolutionsinc.net) in Montville, New Jersey. Slavitt prefers tilt models like the OmniMount U3 Tilt Plasma Mount ($250 list, www.omnimount.com) because they can help reduce glare. For more flexibility, try a cantilever or articulating mount that permits you to adjust the screen up, down, or side to side, such as Sanus Systems' VisionMount VMAA ($550 list, www.sanus.com).

Pick the right spot: Where you hang the screen will be dictated largely by the shape of the room, the location of the studs, and your spouse. But try to minimize the amount of ambient light; if you're hanging the unit across from a window, get a heavy curtain. Planning to mount the thing above a wood-burning fireplace? Make sure that the wall above the mantel doesn't get hotter than 90 degrees or collect soot, and use a tilt mount to reduce neck strain.

For that I'm-so-cool aesthetic, nothing beats a wall mount.

Hang 'em high (but not too high): In general, your eyes should be level with the top of the screen when you're seated, says Dan Liberman, owner of Infinite Sight and Sound (www.infinitesightandsound.com) in Fairfax, Virginia. But you may want to hang the TV slightly higher if the screen is especially large, if you will sit more than 10 feet away, or if it's a place where people will watch while standing up, like a bar or billiards room.

Consider the hole picture: Nothing looks sillier than a beautifully mounted screen with cables dangling beneath. The solution is to cut a hole in the wall behind the screen and snake the wires through it, and then put another hole near where your A/V gear is. But since most building codes forbid running a power cable inside a wall, you should get an electrician to install an AC outlet behind the television set.

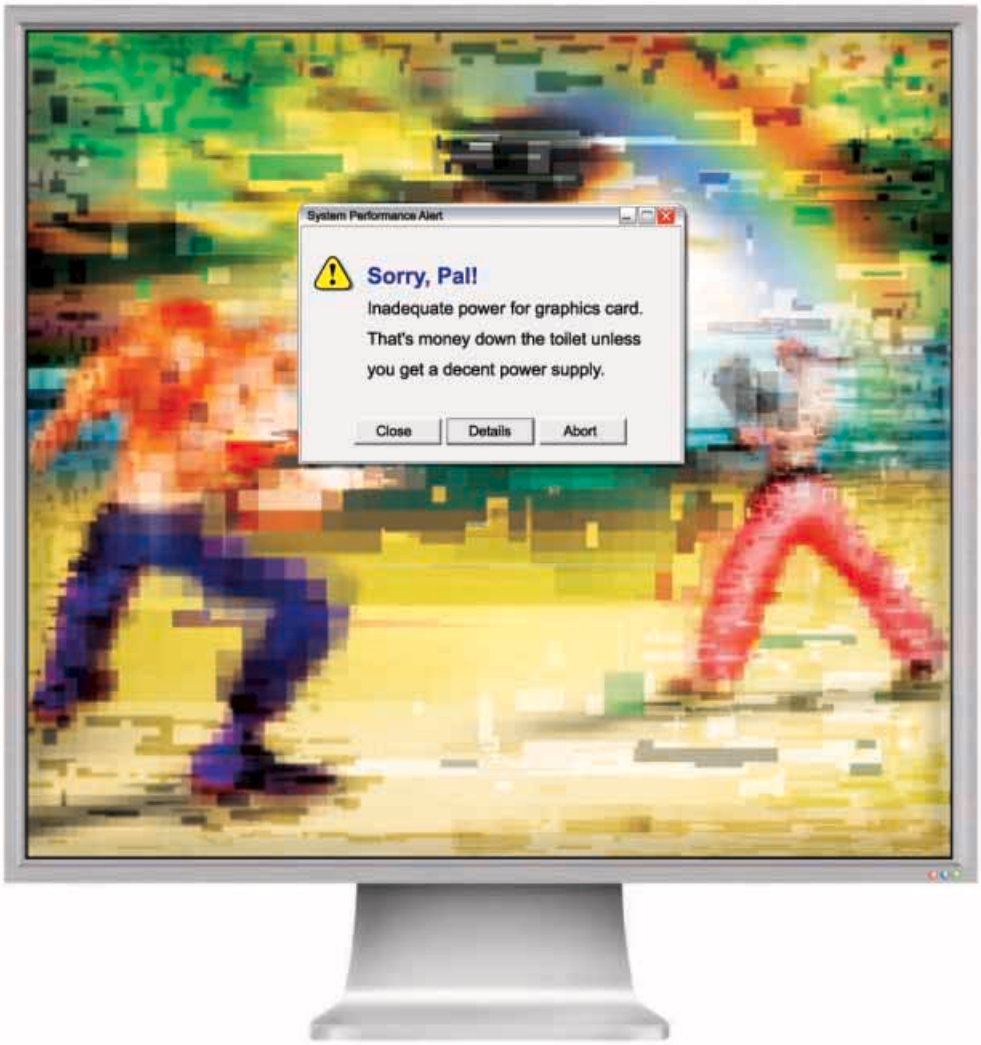
Plug early and often: You don't want to unmount the set just to plug in a new cable. So obtain all your cables—even ones you may not immediately use, such as a DVI cable—and connect them at installation time, suggests Netzer Martinez, senior installer for 6th Ave Electronics (www.6ave.com) in New York. That will make adding new devices later considerably easier.

Don't rush things: Give yourself plenty of time. A professional installation typically takes around 2 hours—3 if it involves snaking cables inside walls, says Liberman. Amateurs should set aside twice that amount (especially if you have the bourbon).

If the whole idea makes you nervous, hire a professional installer. It will likely run you $250 to $400, plus the cost of the mount. Still, that's better than having your screen—and your dreams—lying shattered on the ground. ■

Contributing Editor Dan Tynan is the author of Computer Privacy Annoyances *(O'Reilly, 2005).*

ILLUSTRATION: BARRY BLITT



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Best Seats in the House

• Affordable home theater systems provide a night out at home

If you have been thinking about investing in home theater equipment, you've got plenty of company. Sales of complete systems and home theater components are among the fastest growing categories of consumer digital products.

Here's why: Digital video and audio technologies have advanced in quality and affordability to the point where they have literally transformed living rooms, dens, and family rooms into home theaters that compete in every way with the movie theater experience.

There are some notable differences, however. Home theater enthusiasts can skip the high ticket prices, the crowds, the popcorn-littered floors, and other inconveniences associated with watching movies and other entertainment in theaters. More importantly, vendors are finding increasingly ingenious ways of integrating an ever-widening array of digital products with mainstream consumer technologies to create richer home theater experiences.

Moreover, there are some digital entertainment products that can double as productivity tools for the workplace, including digital projectors.

Dual-purpose technology

The projector needs and requirements of home entertainment aficionados, mobile workers, power users in the enterprise, and small-business professionals are as different as these individuals and the roles they play. Some need LCD projectors; others need the benefits of DLP™ technology. Some need the sharpest images possible while others need projectors with ultraeasy operation, and still others demand lightweight machines.

The good news is that ViewSonic Corp. (www.viewsonic.com), a global leader in providing visual display technology since 1987, has a projector for just about any set of requirements. No matter which projector in the ViewSonic lineup you choose, you'll get a projector that offers high brightness, superb picture quality, and a compact design ideal for any presentation or home theater environment.

The ViewSonic PJ256D weighs only 2.2 lbs. Use it at work and carry it home at night and on weekends to enjoy movies.

For users who need very-high-contrast ratios and razor-sharp images, which is often the case with home entertainment lovers, ViewSonic offers a pair of DLP-based projectors to fit the bill. The ViewSonic PJ755D DLP multimedia projector provides brilliant colors, crisp graphics, and exceptional video. This projector also has user preset selectable viewing modes optimized for PCs, movies, games, or dynamic viewing.

Capable of performing double-duty as an entertainment and a work projector, the ViewSonic PJ256D microportable DLP projector lets users showcase powerful and persuasive presentations anywhere work takes them. Weighing in at a stingy 2.2 pounds, the PJ256D also delivers memorable multimedia presentations with the flexibility of PC and video inputs and a wireless remote control. In other words, the PJ256D lets users work hard during the day and then play hard at leisure during nights and weekends.

All ViewSonic projectors are capable of displaying HDTV signals, too.

For more information on these products and the complete line of exceptional projectors from ViewSonic, visit *www.viewsonic.com.*

Lots of choices, lots of help

Beyond projectors from companies such as ViewSonic, some home theater enthusiasts will prefer to plunk down money—usually considerably less than $1,000—for a complete home entertainment system that includes speakers, a receiver, a DVD player, and other components. And for a nominal fee, many dealers offer setup services that will get you up and running in a few hours. Then just load a DVD and you're ready to enjoy your own home entertainment center.

When choosing a big-screen television, it takes nothing more than a stroll through an electronics emporium to realize just how many choices home theater aficionados have. The options can seem overwhelming. The most important advice is to match the TV as well as the rest of the system to your particular environment. Also, rest assured that the Internet is bursting with advice and information from credible sources to help you buy just what you need, according to your budget and level of technical expertise.

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SPOTLIGHT: DIGITAL SLRs

NIKON'S D70s (left) and Canon's EOS Digital Rebel XT (our Best Buy) offer a lot of features for the price.

Powerful Cameras, Lower Prices

We test seven low-cost digital SLRs to find ones that will help you shoot like a pro.

FOR PHOTOGRAPHERS who want maximum control over their images, nothing beats a single-lens reflex camera, or SLR. Digital SLRs used to be so expensive that only professionals could afford them, but that is changing rapidly. Camera makers such as Canon, whose Digital Rebel debuted two years ago at $999 with a lens, have introduced new SLRs without replacing older models—adding to your range of choices. These low-cost cameras let consumers enjoy professional-grade features and capture great-looking images in difficult shooting environments. Most important, they don't necessitate any big trade-offs: You will get much of the functionality of high-priced SLRs.

We put seven of the latest SLRs through our newly expanded battery of tests. We looked at four low-priced SLRs and three more-expensive models. To evaluate the cameras' image quality more thoroughly, we've added tests that assess how much digital noise each product introduces into its images, and we judge images taken using manual exposure settings; previously, we used only automatic settings.

The most obvious advantage SLRs offer is the ability to swap lenses to suit a particular shooting situation. SLR lenses can achieve very small aperture sizes, down to f22, compared with a limit of f8 found on many fixed lenses. SLRs also tend to be able to shoot at a wider range of speeds: All of the ones here can shoot in increments as long as 30 seconds. The Canon EOS 20D and Nikon D70s can shoot as fast as 1/8000 second; the others can shoot as rapidly as 1/4000 second. Advanced

PHOTOGRAPHS: MARC SIMON

135 DESKTOP PCs
Ready for a dual-core CPU? We review an Alienware PC equipped with AMD's Athlon X2. In the value section, a CyberPower is the new Best Buy.

137 NOTEBOOK PCs
Four new ultraportables make an impressive showing to land on the chart this month, including a Lenovo (née IBM) model with a fingerprint reader.

139 MONITORS
The new high score on our graphics test came from the NEC MultiSync LCD1170GX, which makes a strong chart entrance at number four.

141 PDAs
Seven PDAs debut, including Dell's big-screen Axim X50v and PalmOne's Tungsten T5 with flash-drive capabilities.

143 MORE REVIEWS
PCI Express graphics boards, DVD drives, and monochrome laser printers appear in this month's recap of previous *Top 100* charts.

141

point-and-shoot models, in contrast, usually have a range of shooting speeds from about 2 seconds to 1/3000 second.

Keep in mind that because the image sensors in most digital SLRs are smaller than a frame of 35mm film, the focal length is affected. Usually you have to multiply by 1.5 or 1.6 to get the 35mm equivalent of a lens when you place it on a digital SLR. For example, a 28mm-to-80mm lens for a film SLR will yield the equivalent of roughly 42mm to 120mm on a digital model. The exception is the Olympus EVolt E-300; for its lenses you must multiply by 2. (See the chart on page 130 for the other cameras' multipliers.)

Also, SLRs tout high ISO settings, mimicking the film-speed ratings of 35mm film. An SLR's sensor is highly sensitive to light, which can be particularly helpful when you're shooting without a flash or tripod in dim light. SLRs frequently offer up to ISO 1600 (though two of the cameras we looked at, the Konica Minolta Maxxum 7D and the Pentax *ist DS, go up to ISO 3200), while advanced point-and-shoot cameras often top out at ISO 400. Their expanded range makes SLR units much more capable in situations where low light and fast movement can make capturing a high-quality image difficult.

KEEP THINGS IN FOCUS

AN SLR CAMERA'S autofocus tends to be sophisticated, though you may prefer manually using the focal ring on the lens in some situations, such as when you're shooting in dim light or photographing a small object in macro mode. By contrast, the fixed lenses that most advanced point-and-shoot cameras have lack a focal ring.

Another reason SLRs are superior for manual focusing is that you look through their lens rather than at an image on an LCD or electronic viewfinder. The focal ring on most of the lenses that we tested operated smoothly, though the 18mm-to-55mm EFS lens on the Canon Digital Rebel XT felt a little loose and was less responsive than most others. Also, turning the EFS lens's focal ring moves the entire front section of the barrel, which will change the effects of certain filters.

IF YOU WANT TO TAKE loads of photos in burst mode, you'll like the tireless Olympus EVolt E-300, which is also fast and rugged.

Unlike the other focal rings we tried, which move glass inside the lens mechanically, the focal ring on the Olympus EVolt E-300's lens is connected by wire to an electronic motor. This method lacks the tactile feedback the other lenses provide, but we found the mechanism helpful for fine-tuning the autofocus.

SLRs power up quickly, as well. The Nikon D70s was particularly speedy, ready to shoot in less than a second. And because SLRs have a burst mode, you can shoot continuously while you hold down the shutter button. Burst modes on SLRs are superfast; even sub-$1000 models can take as many as three shots a second. Depending on the image-quality setting you use, some cameras can shoot more than 100 frames at a stretch.

For example, if you use a high-speed CompactFlash card with the Nikon D70s, the camera is rated to take 144 frames in burst mode at the JPEG Normal-Large setting. However, with a standard CompactFlash card and the Fine setting (3008 by 2000 pixels) in our tests, the D70s fired off just 10 successive images before it stopped shooting continuously, and was then capable of capturing only about 1 frame per second. The Olympus EVolt E-300's burst mode, rated at 2.5 frames per second, was impressive, too: The camera never noticeably slowed when shooting 200 consecutive high-quality JPEGs and stopped only when it had filled a 256MB CompactFlash card.

Almost all of the SLRs we looked at excelled in battery life. Every camera but one reached the maximum of 500 shots that our battery tests specify. The only model to fall short of that mark was the Konica Minolta Maxxum 7D, which pooped out after a mere 278 shots.

The Fujifilm FinePix S2 Pro's hulking body has two battery compartments: one for two 3-volt disposable lithium batteries, and the other for four AA batteries (you can't use NiCd rechargeables). Although the S2 Pro has two media card slots, the second slot is for SmartMedia cards; but because SmartMedia cards top out at 128MB, you'll soon have to grab a replacement CompactFlash card if you want to keep shooting. An SD Card slot would have made much more sense. ▶

PREVENTING DIGITAL NOISE

DIGITAL CAMERAS OFFER a distinct benefit in their ability to change their ISO without your having to swap film (or carry multiple cameras loaded with a different film). But like the grainy shots you get when using high-ISO 35mm film, digital images shot at higher ISO settings tend to have more digital noise.

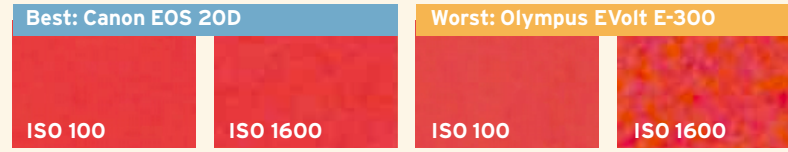
A new test developed by the PC World Test Center enables our jury to evaluate how well cameras minimize noise at a range of ISOs. The Konica Minolta Maxxum 7D and the Canon EOS 20D earned the highest scores on this test, introducing very little noise even at ISO 1600. The Konica Minolta Maxxum 7D and the Pentax *ist DS are the only two cameras here that can shoot at ISO 3200, though at that setting both cameras produced noisy images. The Olympus EVolt E-300, which shoots at up to ISO 1600, received the lowest score in our noise tests. "Comparing Digital Noise," above, shows examples.

You don't have to shoot at a high ISO setting to see distortions, however. Some of the photographs we took using each camera's lowest available ISO setting contained noticeable artifacts. The subject—a chart containing moiré patterns, fine parallel lines, and text—proved challenging for some cameras. After cropping out most of the image, we enlarged the remainder to study the fine details.

The Nikon D70s introduced the most glaring color interference to both the par-

TEST RESULTS

Comparing Digital Noise



IN TESTS CONDUCTED BY the PC World Test Center, the Canon EOS 20D (left) generated little additional noise at high-ISO settings compared with its images captured at lower ISOs. By contrast, the Olympus EVolt E-300 introduced significantly more noise at ISO 1600.

TOP 100 TEST Center

SLRs: More Choices at Less Cost

SOME LESS-EXPENSIVE DIGITAL SLR cameras offer many of the same professional-grade features as pricier models.

	SLR CAMERA[1]	Features and specifications[2]		Performance	Bottom line
1	Canon EOS 20D $1499/$1749 (★★★★½ RETESTED) find.pcworld.com/44874	• 8.2 megapixels • 1.6X focal-length multiplier • Burst mode: 5 frames per second	• 28mm–105mm lens • 1/8000 maximum shutter speed • CompactFlash slot	Image quality: Very Good Features: Outstanding Battery life: Outstanding	This fast, powerful SLR will appeal to pros and advanced amateurs alike; its extensive controls are well designed.
2	Canon EOS Digital Rebel XT Best BUY $899/$999 (★★★★½ RETESTED) find.pcworld.com/48088	• 8.0 megapixels • 1.6X focal-length multiplier • Burst mode: 3 frames per second	• 18mm–55mm lens • 1/4000 maximum shutter speed • CompactFlash slot	Image quality: Very Good Features: Good Battery life: Outstanding	Speed, compact size, and great imaging quality make this unit an excellent choice among inexpensive SLRs.
3	Olympus EVolt E-300 $800/$900 (★★★★☆ RETESTED) find.pcworld.com/48478	• 8.2 megapixels • 2X focal-length multiplier • Burst mode: 2.5 frames per second	• 14mm–45mm lens • 1/4000 maximum shutter speed • CompactFlash slot	Image quality: Very Good Features: Very Good Battery life: Outstanding	This rugged, fast model shoots longer bursts than the others reviewed here and sports a dust-reduction filter.
4	Nikon D70s $899/$1299 (★★★★☆ NEW) find.pcworld.com/48518	• 6.1 megapixels • 1.5X focal-length multiplier • Burst mode: 3 frames per second	• 18mm–70mm lens • 1/8000 maximum shutter speed • CompactFlash slot	Image quality: Fair Features: Outstanding Battery life: Outstanding	Quick power-up, snappy autofocus, and an extensive burst mode are the highlights of this simple-to-use SLR.
5	Pentax *ist DS $800/$900 (★★★★☆ RETESTED) find.pcworld.com/48479	• 6.1 megapixels • 1.5X focal-length multiplier • Burst mode: 2.8 frames per second	• 18mm–55mm lens • 1/4000 maximum shutter speed • SD Card slot	Image quality: Fair Features: Very Good Battery life: Outstanding	Small and light SLR can go up to ISO 3200 and run on four AA batteries, but its image quality wasn't tops.
6	Konica Minolta Maxxum 7D $1499/$1590 (★★★½☆ NEW) find.pcworld.com/48516	• 6.1 megapixels • 1.5X focal-length multiplier • Burst mode: 3 frames per second	• 28mm–100mm lens • 1/4000 maximum shutter speed • CompactFlash slot	Image quality: Fair Features: Very Good Battery life: Good	Has ISO 3200, a roomy 2.5-inch LCD, and built-in antishake technology. Image quality was subpar, however.
7	Fujifilm FinePix S2 Pro $1599/$1998 (★★★☆☆ NEW) find.pcworld.com/48517	• 6.2 megapixels • 1.5X focal-length multiplier • Burst mode: 2 frames per second	• 24mm–135mm lens • 1/4000 maximum shutter speed • CompactFlash and SmartMedia slots	Image quality: Good Features: Very Good Battery life: Outstanding	Easy-to-use SLR is bulky but comes with two battery compartments, two card slots, and a FireWire port.

FOOTNOTES: [1] Prices given are street prices for body only/with kit lens, as of 6/15/05. [2] Resolutions are expressed in effective pixels. Focal-length multiplier is the factor by which a lens's focal length is increased against the same lens in a 35mm film camera. **HOW WE TEST:** To gauge picture quality, we take a series of shots, with and without flash, at the camera's highest resolution, in default automatic and semiautomatic settings. We photograph a complex still life, a mannequin, and a test pattern to see how well each camera captures details and subtle colorings such as skin tones. A panel of judges reviews the on-screen and printed photos and assigns image-quality scores; we then average those scores. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. **CHART NOTES:** Star ratings are based on picture quality, ease of use, features, battery life, and support. Price is taken into consideration for Best Buy honors only. See find.pcworld.com/10860 for details on *PC World*'s Star Ratings. Visit find.pcworld.com/48482 for reviews of all products ranked in this chart.

allel lines and the text. The Pentax *ist DS produced the haziest image of these fine details, while the Canon 20D rendered the sharpest one. Among the lower-cost SLRs, the Canon Digital Rebel XT introduced the fewest color artifacts and the least distortion. Though you may not notice such artifacts in an uncropped image printed at 8 by 10 inches, being able to crop closely and make a large print without distracting distortions gives you a lot of flexibility. By comparison, the advanced point-and-shoots that we put through this test produced a lot more noise at lower ISOs than any of the SLRs we tested.

We've found that SLRs frequently underexpose their shots when using automatic settings, perhaps to preserve detail in highlights. But SLR users are unlikely simply to snap away with automatic settings. That's why we now include a shot taken with manual adjustments made to exposure settings and white balance. On this test, Fujifilm's FinePix S2 Pro earned the highest score, although its score for a photo taken with fully automatic settings was only in the middle of the pack. (For all tests, we shoot our photos at the camera's highest-quality JPEG setting.)

UNIQUE FEATURES

IN AN EFFORT TO distinguish themselves, some SLRs tout potentially innovative features. The Olympus EVolt E-300 uses predictive focusing, which attempts to forecast where your moving subject will be when you trip the shutter. In images taken of fast-moving cars both with and without predictive focusing, the E-300 showed no difference in sharpness.

THE CANON EOS 20D (left) and the Fujifilm FinePix S2 Pro are bulky but offer features tailored to professional photographers.

More important, if anything, is how quickly (or slowly) a camera focuses in the first place; many of the E-300's photos showed only half of a car in them because the camera was frustratingly slow to lock on focus and trigger the shutter. By contrast, the autofocus on the Nikon D70s was snappy, managing to capture a quickly running dog; the camera's rapid 1/8000 shutter speed didn't hurt either.

The EVolt E-300 has an internal mechanism for fighting dust: a filter that sits between the shutter and the sensor to catch dust particles. Changing lenses on an SLR exposes the camera's interior to dust, which can show up on your images. Getting dust out of a camera can be an exasperating—and costly—ordeal; see "The Dirt on Digital SLRs' Dust," below.

The Konica Minolta Maxxum 7D boasts antishake technology built into the camera body. In our informal tests, the 7D's sensor effectively compensated for restless subjects and shaky hands, producing noticeably sharper photos than we obtained after turning off antishaking. Many cameras put this feature in their lenses, which may make the lenses more expensive. Most of the kit lenses sold with low-cost SLRs add about $100 to the cost of the camera (and don't include an antishake feature); by contrast, prices for Canon's 28mm-to-135mm lens with image stabilization range from $400 to $570.

PROS AND CONS

DESPITE THE OVERALL superiority of SLRs, not every picture-taking situation calls for one; you're unlikely to use an SLR's extensive capabilities for everyday snapshots. SLRs also tend to be larger and weightier than advanced point-and-shoot cameras. And if the ability to record video with your camera appeals to you, an SLR won't make you happy—none of the digital SLR models we tested record video.

THE KONICA Minolta Maxxum 7D (left) and the Pentax *ist DS shoot at up to ISO 3200.

The price of digital SLRs is no longer prohibitive, although the models on our chart start at a still-significant $800 without a lens. The latest contender to come out swinging is the $900 Nikon D50, but it arrived too late for us to include here; see page 48 for a detailed review.

If you want to go digital and you already own a bunch of lenses for a 35mm SLR, consider buying a body from the same maker—unless it's Olympus, whose digital SLRs require specific lenses. Another option if you own Nikon lenses is the Fujifilm FinePix S2 Pro, which comes equipped with a Nikon lens mount. ■

—Eric Butterfield

ONLINE TIPS

The Dirt on Digital SLRs' Dust

THE IMAGE SENSOR in a digital SLR carries an electrostatic charge that attracts dust, which can ruin photos, especially if you change lenses. To minimize dust, switch lenses quickly while the camera is turned off and facing downward.

If you try to clean the sensor yourself, avoid canned air—it can damage the sensor. Use only a handheld air blower, such as Giotto's Rocket Air Blower (find.pcworld.com/48754). Otherwise, your options are limited. Pro shops and camera makers charge anywhere from $30 to $100 per cleaning. For more tips, and information on camera warranties, see find.pcworld.com/48620.

–Melissa J. Perenson

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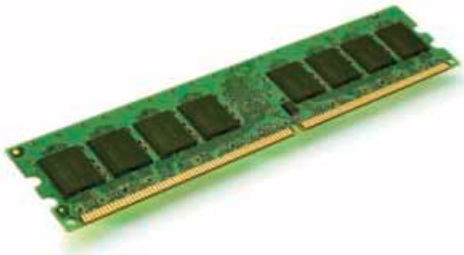

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IN THE CHARTS

EDITED BY THE REVIEWS STAFF

Dual-Core CPUs Achieve Markedly Different Results

TWO OF THE NEW PCs we tested this month carry dual-core processors. The Alienware Aurora 7500 has AMD's 2.4-GHz Athlon X2 4800+, while the ABS Ultimate X6 packs Intel's 3.2-GHz Pentium Extreme Edition 840. Our WorldBench 5 performance scores for these systems demonstrate a couple of things: A dual-core CPU won't necessarily give you better speed than the fastest single-core processors, and clock frequency isn't a reliable gauge of overall quickness.

The Aurora's mark of 118 on WorldBench 5 is the third best on the *Top 15 Desktop PCs* chart, surpassed by two single-core PCs (ABS's Ultimate M6 and Xi Computer's MTower 64 AGE-SLI). Those systems came with twice as much RAM (2GB), however, and the Aurora still outpaced them in 3 of our 13 WorldBench 5 application tests—audio encoding, multitasking, and video encoding. With its speed, 20-inch LCD, and Porsche-style construction, the Aurora roars to the top of our chart. Just be prepared for sticker shock: At $4041 it tops the next-most-expensive power system by $379. (The Ultimate X6 failed to make the chart.) For more information on dual-core processors, head over to find.pcworld.com/48772.

Three systems debut on the value section of our chart. ABS's attractive Ultimate V2, which performed well for its class and offers dual optical drives, takes first place. Micro Express's MicroFlex 35B carries a dual-layer DVD burner and offers strong performance (a WorldBench 5 score of 101) for just $1299; it grabs second place. CyberPower's cool-looking Gamer Ultra 7500 SE ($1075) earns Best Buy honors.

ALIENWARE'S AURORA 7500, with a dual-core Athlon X2 CPU, takes the top power PC spot.

PHOTOGRAPH: RICK RIZNER

NOTEBOOKS

FIVE PORTABLES debut this month. ChemUSA's ChemBook 2070, our fourth-place all-purpose model, has a 15.4-inch wide screen, plus front buttons for screening movies, playing music, and running photo slide shows whether you have the notebook off or on.

The ultraportable section is flush with new laptops, led by the 3.4-pound Lenovo ThinkPad X41. (The weights reported here exclude add-ons such as adapters.) Lenovo's ultraportable has a built-in fingerprint reader and sports an excellent eraserhead-equipped keyboard, but it lacks a built-in optical drive. The optional X4 UltraBase Dock slice ($199) provides an internal bay and legacy ports.

Number two on the ultraportable list is Fujitsu's LifeBook P7010, which includes a fingerprint reader and weighs 3.4 pounds. The P7010 has an integrated DVD burner, but its screen is just 10.6 inches diagonally and its keyboard can't match the ThinkPad's.

Priced at $1163, the WinBook X512 is a fine value. It's a limited version—with half the memory and storage—of its better-equipped sibling, the WinBook X540 (which captured second place on our ultraportable list last month).

Finally, the number four Dell Latitude X1 is one of the lightest laptops available. This 2.5-pound unit includes a 12-inch wide screen, but it produced a disappointing 2.7-hour battery life in our tests.

INSIDE INFO

PDA Power

PC WORLD editors tested a raft of new PDAs, including three PalmOnes (the LifeDrive, the Tungsten T5, and the Tungsten E2), Asus's MyPal A730W, Dell's Axim X50v (which has its own graphics chip), Garmin's IQue M5, and HP's IPaq Rx3715.

More on the Web

PC WORLD uses its industry-standard benchmarking application, WorldBench 5, to evaluate the performance of desktop PCs, notebook PCs, and tablet PCs. Our benchmark runs a number of real-world applications performing real-world computing tasks. For more information on the WorldBench 5 tool, go to find.pcworld.com/44262. Visit find.pcworld.com/10860 for more details about *PC World*'s Star Ratings.

The Top 100 Team

FREELANCERS Lisa Cekan and Richard Jantz, Contributing Editor Carla Thornton, and *PC World* editors Laura Blackwell, Eric Butterfield, Tracey Capen, Kalpana Ettenson, Tom Mainelli, Melissa J. Perenson, Narasu Rebbapragada, Dan Sommer, and Alan Stafford contributed to this month's *Top 100* section. Ulrike Diehlmann, Julio Giannobile, Elliott Kirschling, Jeff Kuta, Tony K. Leung, Thomas Luong, and William Wang of the PC World Test Center tested each of the products reviewed in this issue, with logistical support provided by Greg Adler.

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TOP 15 DESKTOP PCs

★ Products in this chart are ordered by star rating. Visit find.pcworld.com/48582 for reviews of all products tested this month and ranked in this chart.

	POWER SYSTEM	Features and specifications [1]		Performance	Bottom line
1	Alienware Aurora 7500 $4041 (★★★★½ NEW) find.pcworld.com/48575	• 2.4-GHz Athlon 64 X2 4800+ • 320GB drive space (RAID) • DVD±RW DL drive	• 20-inch BenQ LCD monitor • 256MB ATI Radeon X850 XT graphics • Logitech Z-5300e speakers	• WorldBench 5 score: 118 • Graphics: Outstanding • Design: Very Good	Pricey but speedy gaming system has a dual-core Athlon CPU, a large LCD, and SLI support.
2	Xi Computer MTower 64 AGE-SLI $3662 (★★★★½ July 05) find.pcworld.com/47900	• 2.6-GHz Athlon 64 FX-55 • 600GB drive space (RAID) • DVD±RW DL drive	• 19-inch ViewSonic LCD monitor • 256MB EVGA E-GeForce 6800 Ultra graphics • Logitech X-620 speakers	• WorldBench 5 score: 125 • Graphics: Outstanding • Design: Good	Gaming PC turned in the highest-ever WorldBench 5 score. With 600GB of storage, it's worth the steep cost.
3	Polywell Poly 939N-FX55 Best BUY $2795 (★★★★½ Apr 05) find.pcworld.com/46714	• 2.6-GHz Athlon 64 FX-55 • 148GB drive space (RAID) • DVD±RW, CD-RW drives	• 19-inch ViewSonic CRT monitor • 256MB NVidia GeForce 6800 Ultra graphics • Creative Inspire T7700 speakers	• WorldBench 5 score: 113 • Graphics: Outstanding • Design: Good	Elegant-looking black-and-silver unit has top-notch performance; a CRT monitor keeps the price down.
4	ABS Ultimate M6 $3599 (★★★★☆ May 05) find.pcworld.com/46942	• 2.6-GHz Athlon 64 FX-55 • 320GB drive space (RAID) • DVD±RW, DVD-ROM drives	• 19-inch Samsung CRT monitor • 256MB ATI Radeon X850 XT graphics • Logitech Z-5500 speakers	• WorldBench 5 score: 122 • Graphics: Outstanding • Design: Very Good	Massive yet stylish gaming PC on wheels earned our second-best WorldBench 5 score. Comes in a matte-silver case.
5	Amax Power 3460+ $3499 (★★★★☆ Apr 05) find.pcworld.com/48600	• 3.46-GHz Pentium 4 EE • 320GB drive space (RAID) • DVD±RW, DVD-ROM drives	• 19-inch ADI LCD monitor • 256MB NVidia GeForce 6600 GT graphics • Creative MegaWorks THX 2.1 250D speakers	• WorldBench 5 score: 99 • Graphics: Very Good • Design: Good	Expensive system offers strong graphics performance and quality, as well as lots of interior space.
6	Micro Express MicroFlex 3464 $2299 (★★★½☆ Aug 05) find.pcworld.com/48136	• 3.4-GHz Pentium 4 650 • 400GB drive space • DVD±RW drive	• 19-inch ViewSonic LCD monitor • 256MB ATI Radeon X850 graphics • Logitech Z-560 speakers	• WorldBench 5 score: 111 • Graphics: Very Good • Design: Good	Plenty of pep for video editing and gaming, but overclocking to 3.67 GHz may cause problems down the line.
7	HP Pavilion D4000e $2465 (★★★½☆ NEW) find.pcworld.com/48578	• 2.4-GHz Athlon 64 4000+ • 400GB drive space • DVD±RW, DVD-ROM drives	• 17-inch HP LCD monitor • 256MB NVidia GeForce 6600 graphics • Klipsch Promedia 2.1 speakers	• WorldBench 5 score: 101 • Graphics: Very Good • Design: Fair	Reasonably priced business tower is feature-packed. Multimedia DVD burner has HP's LightScribe disc labeling.
	VALUE SYSTEM				
1	ABS Ultimate V2 $1599 (★★★★☆ NEW) find.pcworld.com/48572	• 2.4-GHz Athlon 64 3400+ • 200GB drive space • DVD±RW DL, DVD-ROM drives	• 17-inch Sony LCD monitor • 128MB EVGA E-GeForce 6600 GT graphics • Logitech X-530 speakers	• WorldBench 5 score: 98 • Graphics: Very Good • Design: Very Good	Brisk performance, dual DVD drives, and solid sound highlight this silver-and-black midsize tower.
2	Micro Express MicroFlex 35B $1299 (★★★★☆ NEW) find.pcworld.com/48580	• 2.2-GHz Athlon 64 3500+ • 250GB drive space • DVD±RW/-RAM DL drive	• 17-inch LG LCD monitor • 128MB Sapphire Radeon 9800 Pro graphics • Creative Inspire P5800 speakers	• WorldBench 5 score: 101 • Graphics: Very Good • Design: Very Good	Strong value and performance; midsize tower includes a dual-layer burner and top-mounted USB and audio ports.
3	Shuttle Computer XPC i8600b $1611 (★★★★☆ June 05) find.pcworld.com/47600	• 3-GHz Pentium 4 530J • 320GB drive space • DVD-ROM/CD-RW combo drive	• 17-inch Shuttle LCD monitor • Integrated Intel 915G graphics • Eight-in-one media-card reader	• WorldBench 5 score: 82 • Graphics: Good • Design: Very Good	Shoe box–size unit provides almost everything in a compact space that a standard minitower does.
4	HP Pavilion A1050y $1870 (★★★★☆ Aug 05) find.pcworld.com/48134	• 3.6-GHz Pentium 4 560 • 160GB drive space • DVD±RW DL, CD-ROM drives	• 19-inch HP LCD monitor • 256MB NVidia GeForce 6600 graphics • Speakers built into monitor	• WorldBench 5 score: 89 • Graphics: Very Good • Design: Good	Clean-looking system for home media and general computing tasks; includes LightScribe for labeling discs.
5	Lenovo ThinkCentre A50 $1067 (★★★★☆ June 05) find.pcworld.com/47599	• 3-GHz Pentium 4 530 • 400GB drive space • DVD-ROM/CD-RW combo drive	• 17-inch Lenovo LCD monitor • Integrated Intel Extreme Graphics 2 • Speakers built into monitor	• WorldBench 5 score: 78 • Graphics: Fair • Design: Very Good	Tool-less design and advanced security features distinguish this slim, good-looking, all-business machine.
6	CyberPower Gamer Ultra 7500 SE Best BUY $1075 (★★★½☆ NEW) find.pcworld.com/48576	• 2-GHz Athlon 64 3200+ • 160GB drive space • DVD±RW DL, DVD-ROM drives	• 17-inch ViewSonic LCD monitor • 256MB EVGA E-GeForce 6600 graphics • Logitech X-530 speakers	• WorldBench 5 score: 90 • Graphics: Outstanding • Design: Very Good	Jazzy neon-lit unit has an adjustable fan controller, a dual-layer optical writer, and a stellar LCD.
7	Gateway Profile 5.5C $1885 (★★★½☆ June 05) find.pcworld.com/47602	• 3.2-GHz Pentium 4 540 • 160GB drive space • DVD±RW drive	• 17-inch Gateway LCD monitor • Integrated ATI Radeon X300 LE graphics • Speakers built into monitor	• WorldBench 5 score: 84 • Graphics: Very Good • Design: Very Good	The only all-in-one system on our chart, the Profile is nicely designed and great for a limited space.
8	Velocity Micro ProMagix PCX $1757 (★★★½☆ Mar 05) find.pcworld.com/46276	• 3.4-GHz Pentium 4 550 • 200GB drive space • DVD±RW, DVD-ROM/CD-RW drives	• 19-inch CTX CRT monitor • 128MB EVGA E-GeForce 6600 graphics • Creative Inspire P5800 speakers	• WorldBench 5 score: 94 • Graphics: Very Good • Design: Very Good	Fast PC is very expandable, and the all-black aluminum case is attractive. But at this price, you deserve an LCD.

FOOTNOTE: [1]Features listings are not exhaustive; hard-drive capacity may represent multiple drives; DL = Double-layer (optical drives); EE = Extreme Edition (of Pentium 4). **CHART NOTES:** Street prices are as of 6/15/05. See find.pcworld.com/10860 for details on *PC World's* Star Ratings. Price is taken into consideration for Best Buy honors only. All tests designed and conducted by the PC World Test Center. All rights reserved.

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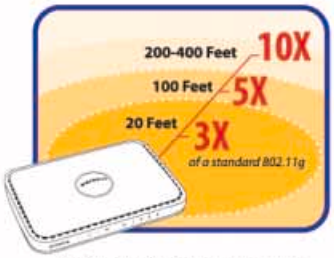

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TOP 15 NOTEBOOK PCs

TOP 100 TEST Center

★ Products in this chart are ordered by star rating. Visit find.pcworld.com/48550 for reviews of all products tested this month and ranked in this chart.

	DESKTOP REPLACEMENT	Features and specifications [1]		Performance	Bottom line
1	Acer TravelMate 8100 $2299 (★★★★☆ Aug 05) find.pcworld.com/48221	• 2-GHz Pentium M 760 • 15.4-inch wide screen • 7.6 pounds	• Double-layer DVD±RW drive • Touchpad pointing device • 802.11g, Bluetooth, gigabit ethernet, smart card slot	• WorldBench 5 score: 94 • Overall design: Very Good • Tested battery life: 4:04	Chic and pricey wide-screen model has a DVI port for connecting the latest digital monitors.
2	Lenovo ThinkPad T43 Best BUY $1999 (★★★★☆ July 05) find.pcworld.com/47826	• 1.86-GHz Pentium M 750 • 14.1-inch screen • 6.4 pounds	• DVD±RW/-RAM drive • Touchpad and eraserhead pointing devices • 802.11g, Bluetooth, gigabit ethernet	• WorldBench 5 score: 84 • Overall design: Very Good • Tested battery life: 5:02	This slim unit includes a handy biometric fingerprint reader as well as an ExpressCard slot.
3	Dell Inspiron 6000 $2271 (★★★★☆ May 05) find.pcworld.com/47230	• 2-GHz Pentium M 760 • 15.4-inch wide screen • 8.4 pounds	• DVD±RW drive • Touchpad pointing device • 802.11a/g, SD Card slot, WordPerfect Office 12	• WorldBench 5 score: 89 • Overall design: Good • Tested battery life: 5:07	Big laptop combines strong performance, a high native resolution (1920 by 1200), and great speakers.
4	HP Pavilion Dv4000 $1189 (★★★★☆ July 05) find.pcworld.com/47827	• 1.86-GHz Pentium M 750 • 15.4-inch wide screen • 7.6 pounds	• Double-layer DVD±RW drive • Touchpad pointing device • 802.11g, ExpressCard slot, Microsoft Works 8	• WorldBench 5 score: 77 • Overall design: Good • Tested battery life: 3:23	Elegant 15.4-inch wide screen features an ExpressCard slot and includes a six-in-one media reader.
5	Alienware Area-51m 7700 $3214 (★★★½☆ Aug 05) find.pcworld.com/48222	• 3.6-GHz Pentium 4 560J • 17.0-inch wide screen • 14.8 pounds	• DVD±RW drive • Touchpad pointing device • 802.11g, seven-in-one media card reader	• WorldBench 5 score: 90 • Overall design: Very Good • Tested battery life: 1:10	Heavy laptop has a built-in camera, optional dual RAID hard drives, and a built-in cable TV connection.
	ALL-PURPOSE NOTEBOOK				
1	HP Compaq Nc8230 $2164 (★★★★½ May 05) find.pcworld.com/47228	• 2-GHz Pentium M 760 • 15.4-inch wide screen • 7.3 pounds	• DVD-ROM and CD-RW combo drive • Touchpad and eraserhead pointing devices • 802.11g, Bluetooth, SD Card slot	• WorldBench 5 score: 85 • Overall design: Good • Tested battery life: 5:11	Classy-looking model has a quick-launch presentation button and a superhigh-resolution screen.
2	Lenovo ThinkPad R52 Best BUY $1379 (★★★★☆ July 05) find.pcworld.com/47828	• 1.73-GHz Pentium M 740 • 14.1-inch screen • 7.0 pounds	• DVD-ROM and CD-RW combo drive • Touchpad and eraserhead pointing devices • 802.11g, Bluetooth, ExpressCard slot	• WorldBench 5 score: 77 • Overall design: Outstanding • Tested battery life: 3:30	This model's fine keyboard has dual pointing devices, and its modular bay accepts many optional drives.
3	Micro Express CL5620 $1599 (★★★½☆ May 05) find.pcworld.com/46172	• 2-GHz Pentium M 755 • 15.0-inch screen • 7.2 pounds	• DVD±RW drive • Touchpad pointing device • 802.11g, SD Card slot	• WorldBench 5 score: 97 • Overall design: Fair • Tested battery life: 3:56	Elegant-looking laptop sports a beautiful high-resolution screen and an ultrafirm keyboard.
4	Chem USA ChemBook 2070 $1769 (★★★½☆ NEW) find.pcworld.com/48552	• 2-GHz Pentium M 760 • 15.4-inch wide screen • 7.6 pounds	• Double-layer DVD±RW drive • Touchpad pointing device • 802.11a/g, four-in-one media card reader	• WorldBench 5 score: 89 • Overall design: Good • Tested battery life: 2:53	High-resolution wide screen with optional TV tuner makes an excellent stand-alone CD and DVD player.
5	Toshiba Satellite R15-S822 $1599 (★★★½☆ July 05) find.pcworld.com/47829	• 1.6-GHz Pentium M 725 • 14.1-inch screen • 7.0 pounds	• DVD-ROM and CD-RW combo drive • Touchpad pointing device • 802.11g, SD Card slot	• WorldBench 5 score: 69 • Overall design: Good • Tested battery life: 5:18	Convertible tablet is a bit heavy to carry around easily, but its 14.1-inch screen offers lots of room to write.
	ULTRAPORTABLE				
1	Lenovo ThinkPad X41 $2049 (★★★★☆ NEW) find.pcworld.com/48670	• 1.5-GHz Pentium M LV 758 • 12.1-inch screen • 4.0 pounds	• DVD-ROM and CD-RW combo drive [2] • Eraserhead pointing device • 802.11g, gigabit ethernet, SD Card slot	• WorldBench 5 score: 64 • Overall design: Good • Tested battery life: 5:19	Updated 3-pound ultraportable now comes with a biometric fingerprint reader for extra security.
2	Fujitsu LifeBook P7010 Best BUY $1899 (★★★½☆ NEW) find.pcworld.com/48558	• 1.2-GHz Pentium M LV 753 • 10.6-inch wide screen • 4.2 pounds	• DVD±RW/-RAM drive • Touchpad pointing device • 802.11g, four-in-one media card reader	• WorldBench 5 score: 63 • Overall design: Very Good • Tested battery life: 5:18	Full-featured laptop delivers long battery life but has a frustrating keyboard and an undersize screen.
3	WinBook X512 $1163 (★★★½☆ NEW) find.pcworld.com/48672	• 1.5-GHz Pentium M • 12.1-inch wide screen • 5.6 pounds	• DVD-ROM and CD-RW combo drive • Touchpad pointing device • 802.11g	• WorldBench 5 score: 67 • Overall design: Fair • Tested battery life: 3:24	This unit has an elegant Media Center Edition knockoff app and makes a dandy stand-alone DVD player.
4	Dell Latitude X1 $2051 (★★★☆☆ NEW) find.pcworld.com/48674	• 1.1-GHz Pentium M ULV 733 • 12.0-inch screen • 4.4 pounds	• DVD-ROM and CD-RW combo drive [3] • Touchpad pointing device • 802.11g, Bluetooth, gigabit ethernet	• WorldBench 5 score: 60 • Overall design: Fair • Tested battery life: 2:40	Lightweight ultraportable offers a sharp 12.1-inch wide screen and has a dedicated CompactFlash slot.
5	Asus W5A $1649 (★★★☆☆ Aug 05) find.pcworld.com/48675	• 1.73-GHz Pentium M 740 • 12.1-inch wide screen • 5.0 pounds	• DVD-ROM and CD-RW combo drive • Touchpad pointing device • 802.11g, Bluetooth	• WorldBench 5 score: 76 • Overall design: Good • Tested battery life: 2:55	This cream-colored model has an easy-to-use, built-in camera for still shots and video but has poor sound.

FOOTNOTES: [1] Features listings are not exhaustive. [2] Optical drive housed in docking station. [3] Optical drive is an external device. **CHART NOTES:** Street prices are as of 6/20/05. Weight includes AC adapter, power cord, and optical drive. Optical drives are removable unless otherwise noted. Price is taken into consideration for Best Buy honors only. All tests designed and conducted by the PC World Test Center. All rights reserved. See find.pcworld.com/10860 for details on *PC World's* Star Ratings.

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TOP 10 MONITORS

★ Products in this chart are ordered by star rating. Visit find.pcworld.com/48606 for reviews of all products tested this month and ranked in this chart.

NEC'S GLOSSY-SCREEN MultiSync LCD1770GX—the first monitor in NEC's new high-performance GX series we've seen—displayed vivid colors and subtly varied flesh tones better than any other recently tested 17-incher. The sweetest thing about the LG Flatron 1781Q's screen is its ability to keep the desktop right side up when the monitor pivots or flips. CTX Technology's F773P earned a lower image-quality score than its sibling F773 did, but its greater array of physical adjustments makes it more versatile and comfortable to use. This month sees only one change in the chart's top three slots, as a substantial price drop since our March rankings came out earns the previously tested Samsung SyncMaster 711t a Best Buy. Sharp's nicely priced, analog-only LL-173C and ViewSonic's speedy VX724 round out the list.

NEC MULTISYNC LCD1770GX.

Speaking of speed: A low pixel-response time suggests smooth movement in everything from scrolling Web pages to playing action-packed games. Vendors describe response time in various ways, however, rendering comparisons difficult. To remedy this, *PC World* has begun reporting the type of response time the vendor specifies. When a vendor specifies gray-to-gray and rise-and-fall response times, we report both numbers.

	17-INCH LCD MONITOR	Features and specifications[1]		Performance	Bottom line
1	Eizo FlexScan L568 $549 (★★★★☆ Mar 05) find.pcworld.com/46180	• Inputs: One analog and one digital • Adjustments: Tilt, swivel, pivot, and height	• 25ms response time • Viewing angle: 178/178	• Text quality: Very Good • Graphics quality: Very Good • Usability: Very Good	Pro model showed overall excellent image quality and came in second for graphics. Extensive controls make it a fine choice for demanding apps.
2	Dell UltraSharp 1704FPV Best BUY $349 (★★★★☆ Mar 05) find.pcworld.com/46178	• Inputs: One analog and one digital • Adjustments: Tilt, swivel, pivot, and height	• 25ms response time • Viewing angle: 178/178 • Four-port USB 2.0 hub	• Text quality: Very Good • Graphics quality: Very Good • Usability: Very Good	Great all-purpose display performed well on our tests. It supplies a full range of adjustments and well-chosen extras at a reasonable price.
3	Samsung SyncMaster 711t Best BUY $349 (★★★★☆ Mar 05) find.pcworld.com/46298	• Inputs: One analog and one digital • Adjustments: Tilt, swivel, pivot, and height	• 25ms rise-and-fall response time • Viewing angle: 178/178	• Text quality: Very Good • Graphics quality: Very Good • Usability: Very Good	Included MagicTune software lets you tweak on-screen settings with mouse clicks instead of with a cumbersome series of button pushes.
4	NEC MultiSync LCD1770GX $400 (★★★★☆ NEW) find.pcworld.com/48523	• Inputs: One analog and one digital • Adjustments: Tilt, swivel, and height	• 8ms response time • Viewing angle: 160/160 • Four-port USB 2.0 hub	• Text quality: Very Good • Graphics quality: Very Good • Usability: Good	Glossy screen helped this monitor to the highest graphics score of any 17-incher we've reviewed lately, but cabinet design is utilitarian-looking.
5	IBM ThinkVision L170p $400 (★★★★☆ Mar 05) find.pcworld.com/37499	• Inputs: One analog and one digital • Adjustments: Tilt, swivel, and height	• 25ms rise-and-fall response time • Viewing angle: 170/170	• Text quality: Very Good • Graphics quality: Very Good • Usability: Very Good	Well-built model performed competently across the board; large, curved buttons are comfortable and easy to use, even for large hands.
6	LG Electronics Flatron L1781Q $499 (★★★★☆ NEW) find.pcworld.com/48522	• Inputs: One analog and one digital • Adjustments: Tilt, pivot, and height	• 8ms response time • Viewing angle: 160/160 • Four-port USB 2.0 hub	• Text quality: Very Good • Graphics quality: Fair • Usability: Very Good	Smaller version of the World Class Award-winning Flatron L1981Q is the only 17-incher we've seen with automatic screen pivot and mirroring.
7	CTX Technology F773P $435 (★★★½☆ NEW) find.pcworld.com/48520	• Inputs: One analog and one digital • Adjustments: Tilt, swivel, pivot, and height	• 6ms gray-to-gray • 16ms rise-and-fall • Viewing angle: 140/140	• Text quality: Very Good • Graphics quality: Very Good • Usability: Good	Following up on the clear text and rich color display of its predecessor, the F773, the F773P adds a fully adjustable stand.
8	Sharp LL-173C $299 (★★★☆☆ NEW) find.pcworld.com/48528	• Inputs: One analog • Adjustment: Tilt	• 12ms rise-and-fall response time • Viewing angle: 160/160	• Text quality: Very Good • Graphics quality: Good • Usability: Good	Advanced settings like black level and gamma are unusual at this price, but Sharp's otherwise no-frills display restricts physical adjustments to tilt.
9	ViewSonic VX724 $329 (★★★☆☆ NEW) find.pcworld.com/48530	• Inputs: One analog and one digital • Adjustment: Tilt	• 4ms gray-to-gray • 6ms white-black-white • Viewing angle: 160/160	• Text quality: Very Good • Graphics quality: Good • Usability: Good	Fast pixel response time and an attractive black-and-silver design don't make up for the VX724's mediocre graphics quality.
10	Envision EN7410 $279 (★★★☆☆ Mar 05) find.pcworld.com/46186	• Inputs: One analog • Adjustment: Tilt	• 16ms response time • Viewing angle: 140/120	• Text quality: Very Good • Graphics quality: Very Good • Usability: Good	A low price and surprisingly good image quality draw attention to this analog-only unit—but so does its flimsy feel.

FOOTNOTE: [1]Digital inputs require a graphics card with a DVI digital output, which we use to test all monitors that offer DVI. Unless otherwise specified, "analog" refers to 15-pin analog and "digital" refers to DVI. Response times are vendor-reported specifications; types of response time, such as "gray-to-gray" and "rise-and-fall," are vendor-provided terms. See find.pcworld.com/48858 for details. Viewing angle is reported in degrees; horizontal viewing angle is reported first, followed by vertical viewing angle. **HOW WE TEST:** Judges rate how well each monitor displays 13 text and graphics images at a native resolution of 1280 by 1024. Some screens are from DisplayMate for Windows (www.displaymate.com). See find.pcworld.com/34613 for testing details. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. **CHART NOTES:** Prices given are street prices as of 6/24/05. Star ratings are based on text quality, graphics quality, features, ease of use, and service and support. Price is taken into consideration for Best Buy honors only. See find.pcworld.com/10860 for details on *PC World*'s Star Ratings.

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Operating System	Microsoft® Windows® XP Professional
Main memory	1GB DDR2 533MHz Dual Channel
Graphics	ATI® Radeon® X600 PRO 256MB PCI Express
Hard drive	160GB 7200RPM Serial ATA
Optical drive	52X CDRW/16X DVD Combo drive
Media Reader	8-in-1 Built-in Card Reader
System Cooling	Integrated Cooling Engine (ICE) Liquid Cooling
Dimensions (L x W x H)	12.6 x 8.26 x 8.66 (in); 320 x 210 x 220 (mm)

* monitor not included

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TOP 10 PDAs

★ Products in this chart are ordered by star rating. Visit find.pcworld.com/48856 for reviews of all products tested this month and ranked in this chart.

FOUR OF THE FIVE PRODUCTS in our Microsoft Windows Mobile category are new since we published our last chart in December 2004, and they pack some interesting entertainment options. The top-ranked Dell Axim X50v comes with a dedicated graphics chip and Windows Media Player Mobile 10, which plays music from select subscription services. The second-ranked Asus MyPal A730W includes a 1.3-megapixel camera. Hewlett-Packard's fourth-place IPaq Rx3715 can wirelessly access music and some video stored on a networked PC; and Garmin's IQue M5, on the chart at number five, doubles as a GPS device.

Three PDAs debut on the Palm OS side. The PalmOne Tungsten T5 came in first and earned our Best Buy for its brilliant screen and whopping 256MB of nonvolatile flash memory, which ensures you'll never lose your data as a result of battery failure. The T5 also works as a USB 2.0–connected 160MB storage device. Marketed as a laptop alternative, PalmOne's LifeDrive (second on the list) offers a 4GB drive, Wi-Fi, Bluetooth, and a nifty application for downloading photos straight from a camera. And in third place is the Tungsten E2, which lacks the bells and whistles of the T5 and the LifeDrive but is a good value for users who still consider a PDA first and foremost a contact-management tool.

PALMONE'S Tungsten T5.

	WINDOWS MOBILE PDA	Features and specifications[1]		Performance	Bottom line
1	Dell Axim X50v Best BUY $499 (★★★★½ NEW) find.pcworld.com/48760	• Windows Mobile 2003 Second Ed. • 128MB • 640-by-480-pixel resolution	• SD/SDIO/MMC, CF II card slots • Wi-Fi, Bluetooth • 6.2 ounces	• Ease of use: Very Good • Features: Outstanding • Support: Very Good	Loaded with a fast processor, a graphics chip, and Windows Media Player Mobile 10, this top-ranked PDA is a multimedia dream.
2	Asus MyPal A730W $559 (★★★★☆ NEW) find.pcworld.com/48762	• Windows Mobile 2003 Second Ed. • 128MB • 640-by-480-pixel resolution	• SD/SDIO/MMC, CF II card slots • Wi-Fi, Bluetooth • 6.0 ounces	• Ease of use: Very Good • Features: Outstanding • Support: Good	Full-featured wireless PDA has a 1.3-megapixel camera, a beautiful screen, a removable battery, and an extra battery.
3	HP IPaq Hx4705 $600 (★★★★☆ Dec 04) find.pcworld.com/44636	• Windows Mobile 2003 Second Ed. • 64MB • 640-by-480-pixel resolution	• SD/SDIO/MMC, CF II card slots • Wi-Fi, Bluetooth • 6.6 ounces	• Ease of use: Good • Features: Outstanding • Support: Very Good	This fast and pricey model struts its stuff on a colorful, high-res VGA screen—but the clumsy touchpad lacks the magic touch.
4	HP IPaq Rx3715 $450 (★★★★☆ NEW) find.pcworld.com/48768	• Windows Mobile 2003 Second Ed. • 152MB • 240-by-320-pixel resolution	• SD/SDIO/MMC card slot • Wi-Fi, Bluetooth • 5.6 ounces	• Ease of use: Good • Features: Outstanding • Support: Very Good	Unit with a 1.2-megapixel camera and a removable battery works as a remote control and wirelessly streams media from a PC.
5	Garmin IQue M5 $750 (★★★★☆ NEW) find.pcworld.com/48758	• Windows Mobile 2003 Second Ed. • 64MB • 320-by-240-pixel resolution	• SD/SDIO/MMC card slot • Bluetooth • 5.9 ounces	• Ease of use: Very Good • Features: Good • Support: Adequate	GPS/PDA device comes with a high-quality screen and a car charger. Its MapSource software is comprehensive.
	PALM OS PDA				
1	PalmOne Tungsten T5 Best BUY $399 (★★★★½ NEW) find.pcworld.com/48761	• Palm OS 5.4 • 256MB • 320-by-480-pixel resolution	• SD/SDIO/MMC card slot • Bluetooth • 5.1 ounces	• Ease of use: Very Good • Features: Good • Support: Good	The T5 provides 256MB of nonvolatile flash memory, so you won't lose data; 160MB of that memory serves as a USB storage drive.
2	PalmOne LifeDrive $499 (★★★★☆ NEW) find.pcworld.com/48756	• Palm OS 5.4 • 64MB • 320-by-480-pixel resolution	• SD/SDIO/MMC card slot • Wi-Fi, Bluetooth • 6.8 ounces	• Ease of use: Good • Features: Very Good • Support: Good	Palm's newest PDA has a 4GB hard drive for playing video and music, storing files, and—our favorite—offloading photos.
3	PalmOne Tungsten E2 $249 (★★★★☆ NEW) find.pcworld.com/48766	• Palm OS 5.4 • 32MB • 320-by-320-pixel resolution	• SD/SDIO/MMC card slot • Bluetooth • 4.7 ounces	• Ease of use: Very Good • Features: Good • Support: Adequate	This well-priced business PDA has a great screen and multimedia capabilities. It comes with just a 90-day warranty.
4	PalmOne Zire 72 $299 (★★★★☆ July 04) find.pcworld.com/42246	• Palm OS 5.2.8 • 32MB • 320-by-320-pixel resolution	• SD/SDIO/MMC card slot • Bluetooth • 4.8 ounces	• Ease of use: Very Good • Features: Very Good • Support: Good	The Zire 72 offers a 1.2-megapixel camera and a voice recorder. The current Special Edition model is silver instead of blue.
5	Garmin IQue 3200 $500 (★★★½☆ Dec 04) find.pcworld.com/44438	• Palm OS 5.2.1 • 32MB • 320-by-320-pixel resolution	• SD/SDIO/MMC card slot • No Wi-Fi or Bluetooth • 5.0 ounces	• Ease of use: Good • Features: Good • Support: Adequate	This vehicle-mountable PDA/GPS device lacks common Palm PDA features such as Bluetooth and a headphone jack.

FOOTNOTE: [1] Features listings are not exhaustive. SD = Secure Digital, SDIO = Secure Digital Input/Output, MMC = MultiMediaCard, CF II = CompactFlash II. **CHART NOTES:** Prices given are street prices as of 7/1/05. Price is taken into consideration for Best Buy honors only. See find.pcworld.com/10860 for details on *PC World*'s Star Ratings.

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MORE REVIEWS

MISSED AN ISSUE OF *PC World* or passed your copy along to a friend? Here's a recap of *Top 100* topics from previous issues. To read reviews of the products listed in these charts, go online and type in the *PC World* Find-It URL from the top of each chart. Next month in the *Top 100*, we'll evaluate hard drives and point-and-shoot digital cameras, and our Spotlight review will focus on 19-inch LCD monitors. Also be on the lookout for an in-depth feature on power desktop PCs.

PIONEER'S FAST-WRITING DVR-A09XL comes with a stellar software bundle.

OKI DATA'S OKI B4350 has a quick first-page print speed and handles text well.

BFG TECHNOLOGIES' GeForce 6600 GT OC is our speediest value board.

DVD DRIVES

find.pcworld.com/48184

INTERNAL DVD DRIVE	1	Plextor PX-716A (★★★★½ Apr 05) find.pcworld.com/46594
	2	Toshiba SD-R5372 (★★★★½ Apr 05) find.pcworld.com/46600
	3	Pioneer DVR-A09XL Best BUY (★★★★☆ May 05) find.pcworld.com/47261
	4	Lite-On SOHW-1693S (★★★½☆ Aug 05) find.pcworld.com/48156
	5	Sony DRU-800A (★★★½☆ Aug 05) find.pcworld.com/48161
	6	Asus DRW-1608P (★★★½☆ Aug 05) find.pcworld.com/48178
	7	Samsung TS-H552U (★★★½☆ Aug 05) find.pcworld.com/48162
EXTERNAL DVD DRIVE	1	Plextor PX-716UF Best BUY (★★★★½ Aug 05) find.pcworld.com/48180
	2	Hewlett-Packard DVD Writer 640e (★★★½☆ Aug 05) find.pcworld.com/48152
	3	LaCie D2 DVD±RW Double Layer with LightScribe (★★★½☆ Aug 05) find.pcworld.com/48154

From the August 2005 Issue

MONOCHROME LASER PRINTERS

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SMALL-OFFICE PRINTER	1	Oki Data Oki B4350 Best BUY (★★★½☆ Aug 05) find.pcworld.com/44160
	2	Brother HL-2040 (★★★½☆ Aug 05) find.pcworld.com/48106
	3	Samsung ML-2010 (★★★☆☆ Aug 05) find.pcworld.com/48182
	4	Lexmark E330 (★★★☆☆ Aug 05) find.pcworld.com/48114
	5	HP LaserJet 1020 (★★½☆☆ Aug 05) find.pcworld.com/48112
WORKGROUP PRINTER	1	Xerox Phaser 4500N (★★★½☆ Aug 05) find.pcworld.com/44188
	2	Oki Data Oki B6200n Best BUY (★★★☆☆ Aug 05) find.pcworld.com/48236
	3	HP LaserJet 2430tn (★★★☆☆ Aug 05) find.pcworld.com/48113
	4	Lexmark T430dn (★★★☆☆ Aug 05) find.pcworld.com/48235
	5	Samsung ML-2251N (★★½☆☆ Aug 05) find.pcworld.com/48138

From the August 2005 Issue

PCI EXPRESS GRAPHICS BOARDS

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	2	Asus Extreme AX850XT/2DHTV (★★★★½ July 05) find.pcworld.com/47864
	3	PowerColor X800 XT VIVO (★★★★☆ Jan 05) find.pcworld.com/45282
	4	PNY Verto GeForce 6800 GT (★★★½☆ July 05) find.pcworld.com/47866
	5	Aopen Aeolus 6800GT-DV256 Best BUY (★★★½☆ July 05) find.pcworld.com/47868
VALUE BOARD	1	BFG Technologies GeForce 6600 GT OC Best BUY (★★★★☆ July 05) find.pcworld.com/47865
	2	EVGA E-GeForce 6600GT (★★★★☆ Jan 05) find.pcworld.com/45268
	3	MSI NX6600GT-TD128E (★★★★☆ July 05) find.pcworld.com/47871
	4	MSI RX600XT-VTD128E (★★½☆☆ Jan 05) find.pcworld.com/45274
	5	EVGA E-GeForce 6200 (★★½☆☆ July 05) find.pcworld.com/47863

From the July 2005 Issue

PHOTOGRAPHS: RICK RIZNER (LEFT AND CENTER); MARC SIMON (RIGHT)

SELF-DEFENSE

Lost & Found

RestoreIT from FarStone saves the day when data disasters strike

IMAGINE Stanley Cohen's reaction when a flawed update for his dental management software wiped out 800 megabytes of business-critical data, and his immense relief upon learning that RestoreIT, a disaster recovery utility from FarStone Technology, had been bundled with his computer system. Stanley Cohen was able to restore all lost files with a few clicks of a mouse.

"I was amazed," said Cohen of Cohen Dental and Implant Center in Brooklyn, New York. "Within a few minutes, everything was back to its original place and working."

What happened to Cohen – the sudden and unexpected loss of valuable computer data – is not unusual. With the threat of spyware, viruses, and hackers on the rise, with the potential for system crashes, and with multiple users often accessing the same computer systems, the abrupt and dramatic loss of data has become an all-too-familiar event.

Common Computer Disasters

- Operating system failure
- Spyware, virus, and hacker attacks
- Corruption due to failed software installation or updates
- Inadvertently deleted files
- Downloads that compromise system performance
- Hard drive failure

Brilliant design

RestoreIT reduces the effects of common computer disasters. Ideal for desktop or laptop users running most Microsoft Windows operating systems, RestoreIT is a Personal Disaster Recovery™ solution for business users and consumers.

In essence, RestoreIT provides 'first line of defense' protection to recover files and operating systems damaged by viruses, hacker attacks, annoying pop-ups, user errors, and errors that occur during software installations and upgrades.

The true engineering genius of RestoreIT is in its ease of use. Installation is a snap. RestoreIT creates a complete system backup image stored to a hidden partition that sits above the BIOS, but is not a part of the Windows operating system. So in the event of an operating system crash, RestoreIT is standing by with a current image of the data. A real-time agent tracks all sector-level changes, while multiple backup images provide full system restore and disaster recovery. When trouble arises, users simply click and restore to any backup point. In minutes, data restoration is complete.

FarStone's RestoreIT protects business users and consumers against the loss of valuable data.

Disaster be gone!

Users may believe that once they have installed a firewall and antivirus software, data is protected from intruders. But spyware and viruses can still enter the computer and wreak havoc. System files can be corrupted or deleted by malicious programs or through human error. And if the computer crashes, data may not be recoverable without reinstalling the operating system—a time-consuming and often painful process.

FarStone Technology has dedicated itself to the eradication of these threats and to the peace of mind of computer users everywhere. Founded in 1993, FarStone designs and manufactures PC and network-based system recovery solutions, digital content security, and replication and management utilities. FarStone focuses all of its energies and resources on building software to ensure that people like Stanley Cohen and every other RestoreIT user spend their time on their businesses, and not on recovering from digital disasters.

Committed to quality and technological leadership, FarStone is an ISO 9001 certified software publisher holding multiple technology patents. The company has established strong technology partnerships with leading vendors such as Intel, NEC, Fujitsu, Intervideo and Phoenix Technologies, which incorporate FarStone solutions in many of their own offerings.

For users, the value and benefits of RestoreIT are clear. They get automatic and continuous data protection; they avoid the expense of outside support to recover valuable data; and they gain peace of mind in knowing their data is truly safe. RestoreIT is an essential complement to existing security and backup solutions.

RestoreIT just may be the single best insurance policy against the loss of valuable, business-critical data. And it comes from an innovator in "optimizing system recovery and PC performance."

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RestoreIT (single license version) retails for $39.99 and is available at www.farstone.com/restoreit

Back Up and Running–Quickly

R-Tools gives business continuity a big boost

NO AMOUNT of precaution can guarantee 100% against heavy data loss caused by a virus or other malicious attack, hardware failure, or an operating system crash.

That's where R-Tools Technology Inc. (www.r-tt.com), a leader in backup and recovery solutions, steps up with its **R-Drive Image 3.0**, a powerful and business-critical utility that easily creates disk image files for backup or duplication. These disk image files are exact and precise copies of a hard drive partition or logical disk. Furthermore, R-Drive Image creates and compresses these files without interrupting the Windows operating system—and therefore without interrupting your business.

Then, R-Drive Image restores these images back to the original disks or, if users prefer, on any other partitions or on a hard disk's free space, all on the fly and without interruption. All these attributes of R-Drive Image translate into the capability to rapidly restore your system following a serious crash.

And that's not all. Users can exploit R-Drive Image files for mass system deployments when setting up several computers with identical configurations. New features in Version 3.0 include an automated scheduler for disk creation in unattended mode; network support; automated action reports; and expanded device support.

R-Tools also offers an innovative line of data recovery and file reconstruction utilities, including a new version of the powerful **R-Studio** to recover lost data, even from formatted, damaged or deleted disks; **R-Word** to recover damaged Microsoft Word documents; **R-Excel** to rebuild corrupted MS Excel files; and **R-Mail** to rescue accidentally deleted e-mail messages and damaged .dbx files.

The online privacy utility, **R-Wipe & Clean**, keeps disks free and clear of unwanted data. And with an eye toward security, the **R-Guard** host-based intrusion detection system shields users' files from unwanted and potentially disastrous intruders, in addition to allowing users to set advanced access rights for applications and system processes. In addition, **R-Firewall** is a free program that protects LAN clients against external and internal threats.

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Providing AlphaShield Hardware Firewall users with unmatched security, AlphaShield's **AlphaGap**™ technology physically disconnects your computer from the Internet when not in use; reconnection is instantaneous once requested. AlphaShield's **IP Stealth** cloaks all 65,536 ports and your IP address, making your computer invisible to hackers and spyware on the Internet or LAN. AlphaShield's **RPA**™ allows only requested information into your computer, blocking all unsolicited Internet traffic including Trojans and other harmful codes.

AlphaShield provides Internet users an affordable, simple, compact and 100% effective Internet security solution right out of the box. Operating system independent, **AlphaShield's firewall** is a stand-alone security device that does NOT require maintenance, upgrades or patches. AlphaShield can also protect an entire network of computers (up to 50) when placed in front of a router.

AlphaShield is a zero-configuration ("plug-and-play") hardware firewall that requires no software to install and takes less than two minutes to set up

- **Makes your computer invisible to hackers**
- **Takes less than two minutes to set up**
- **Works with any computer system or network**

(www.alphashield.com). High-speed Internet users can now protect themselves from hackers, online credit card fraud and identity theft.

AlphaShield Hardware Firewall ... 100% guaranteed unhackable.

Visit www.alphashield.com for details about this exciting breakthrough in Internet security. AlphaShield is available through major retailers including **Dell, Radio Shack, Best Buy** and **Office Depot** for $99.

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HERE'S HOW

EDITED BY AOIFE M. McEVOY AND DENNIS O'REILLY

WINDOWS TIPS

SCOTT DUNN

Windows' Command Line Puts You in Control

Windows 2K XP 98 ME

SOME OF Windows' most useful tools don't have desktop icons. Nor are they listed on the Start menu, or even in Control Panel. If you search for them in the operating system's labyrinth of folders and subfolders, you probably won't find them. Some don't even exist as independent files. Instead, you launch these terrific tools by entering their text commands in Windows' Run box (or at the command, or DOS, prompt) to perform all sorts of useful tasks quickly. The chart on the facing page lists several of my favorites.

Open the window: Usually you'll type the commands in a command window (which resembles the fabled DOS screen of eons past). To open it in Windows 98, choose *Start•Programs•MS-DOS Prompt*. In Windows Me, click *Start•Programs•Accessories•MS-DOS Prompt*. In Windows 2000 and XP, select *Start•Programs* (*All Programs* in XP)*•Accessories•Command Prompt*. Alternatively, you can open the window by choosing *Start•Run*, typing **command** (in Windows 98 and Me) or **cmd** (in 2000 and XP), and pressing **<Enter>**.

Often you can use commands without opening a prompt window, by clicking *Start•Run* and entering the command there. Some can instead be entered directly in the Address bar of any Explorer or folder window. For a host of additional tips to simplify your command-line life, check out the November 2003 *Windows Tips* at find.pcworld.com/48140.

Stay awake at the switch: While the commands are useful by themselves, their real power comes from their "switches" (optional codes typed at the end of the command that vary the function). For almost every command, the best way to find the appropriate switches is to type the command name followed by a space and **/?**. Then press **<Enter>**. This provides you with a summary of the command's purpose, as well as a description of its syntax (so you'll know which switches to use and in what order) and an explanation of each switch. In some cases you can get help by choosing *Start•Help* and searching for the command name in question.

Drag to avoid typing: When your command acts on a file or folder (such as the 'attrib.exe' and 'compact.exe' commands described below), generally you must type the path to that folder after the command (if the folder name isn't already to the left of the prompt). You can save typing time by doing a little dragging-and-dropping. First, type the desired name into the command window, followed by a space. Next, open Windows Explorer or any folder window and select the file or folder you need. Finally, drag the file or folder from Explorer into the command window. Windows then types the path for you. If your

ILLUSTRATION: GLENN MITSUI

INSIDE

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command needs a second file name (like the 'fc' file-compare command), type another space, and drag and drop a second file or folder in the window. For another way to save on typing, see my description of the 'doskey.exe' command below.

Give it a new look: To spiff up the command line, right-click the title bar of the command window and choose *Properties*. Under the *Font* tab, select the size and style of type you want; this also affects the size of the command window. In Windows 2000 and XP, you can change the background color and the text color via the *Colors* tab (see **FIGURE 1**), and the default size of the window by choosing the *Layout* tab. When you click *OK*, Windows gives you the option of applying the changes to the current window only or to all future command windows as well.

COMMAND COMPENDIUM

THE CHART AT lower left doesn't include the basic navigation and file-management commands from the old DOS days: 'dir' lists the files and folders in a directory, 'cd' changes the current directory, 'format' "erases" a disk, 'md' creates a directory, 'ren' renames a file or folder, 'copy' copies the selection, 'xcopy' copies all of the subdirectories as well, 'move' puts the item in a new location, 'del' removes it, and 'deltree' deletes a directory along with its subdirectories and files.

cmd.exe (Windows 2000 and XP), command.com (98 and Me): These commands (you don't need to enter the period and extension) open the window where you enter the other commands discussed here. Using either one with the **/c** switch, you can create a shortcut that opens a command window, executes a command, and then closes the window. This allows you to launch a command just by double-clicking its icon or choosing it from the Start menu. For example, to make an icon that refreshes your network connection, right-click the desktop or in any folder window and choose *New•Shortcut*. In the first box, type **cmd /c ipconfig /renew** (see **FIGURE 2**, as well as the discussion of 'ipconfig.exe' on page 148). Click *Next* and follow the wizard's instructions to create the shortcut. If you want the command window to stay open so that you can see the results of your command, simply replace the '/c' with **/k**. You can use this shortcut technique with many of the commands listed here.

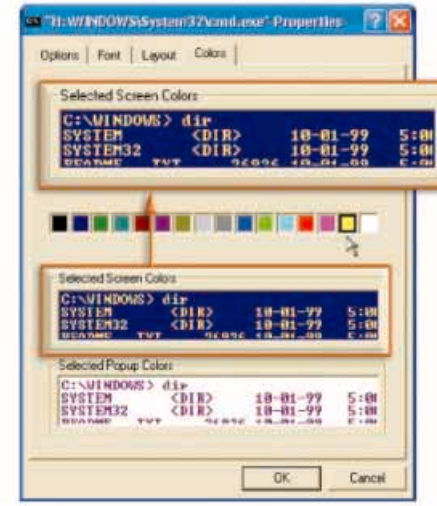


FIGURE 1: CHANGE THE COLOR of your command prompt in its Properties dialog box.

attrib.exe: This command lets you change one or more of a file's attributes (such as 'Hidden', 'System', 'Read-only', or 'Archive'). It's usually easier to right-click the file in an Explorer or folder window, choose *Properties*, and check the desired boxes (see **FIGURE 3**). But when you need to change attributes for files in multiple subfolders, this command line (with the **/s** switch) can do it for you in one step.

compact.exe: If your drive is formatted with the NTFS file system (available ▶

Command Performers

GET FAST ACCESS to many of Windows' most useful tools.

ENTER THIS COMMAND...	To...
cmd.exe (Windows 2000 and XP), command.com (98 and Me)	Open the command window that you use to enter other commands.
attrib.exe	Change one or more of a file's attributes.
compact.exe	Compress, uncompress, or display compression status of one or more files (NTFS drives).
doskey.exe (Windows 2000 and XP), doskey.com (98 and Me)	Install command-line editing tools (including command history) or create a macro.
ipconfig.exe	See your IP, subnet, and gateway addresses.
openfiles.exe	List or close files that are open locally or in shared folders.
ping.exe	Verify, track, or time your connection to a network or remote PC.
recover.exe	Recover readable data and other files from a damaged NTFS hard disk.
runas.exe	Launch an application while you are logged on as a different user.
sort.exe	Sort the lines in the selected file according to the *n*th character in each line.
taskkill.exe	Close one or more running processes or programs.

only in Windows 2000 and XP), you have the option of compressing files and folders by right-clicking them, choosing *Properties*, clicking *Advanced* under the General tab, and selecting the appropriate check box. But what if some of the files in a folder are already compressed (such as JPEG photos), while others could benefit from compressing? Use this command with the **/s** switch and wild-card characters to compress only specific files in the selected directory (and in all its subdirectories). For example, **compact /c /s:c:\doc *.doc** will compress all of the Word documents in your Doc folder and subfolders. To uncompress, change the '/c' to **/u**.

doskey.exe (Windows 2000 and XP), doskey.com (98 and Me): Once you enter this command at the prompt, it stays resident in memory, keeping a list of the commands you type. Just press the up or down arrow keys on your keyboard while at the prompt to scroll through the commands you've used in the past. You can also navigate to a command that's similar to the one you need and then change it as necessary: Move left or right one character with the arrow keys, or left or right one word by holding down **<Ctrl>** and pressing an arrow key. Make your changes and press **<Enter>** to execute the change. To see all the commands you've typed since you loaded Doskey, type **doskey /history**. To clear the history and start afresh, type **doskey /reinstall** (or press **<Alt>-<F7>**).

FIGURE 2: MAKE A shortcut for a command via switches in the Create Shortcut wizard.

Don't bother using Doskey in Windows Me, 2000, or XP. In these versions, the command windows already have a built-in buffer to remember past commands.

ipconfig.exe: This helpful network utility displays your current IP address, as well as its subnet and gateway addresses. Use the **/all** switch to see even more network information. The **/renew** switch (**/renew_all** in Windows 98 and Me) refreshes the connections. (See also 'ping.exe' below.)

openfiles.exe: If you need to figure out who on your network has a shared file open, type this command at the prompt and press **<Enter>**. You can also use it to close the open files in a shared folder or to disconnect the user currently viewing them. For details, type **openfiles /disconnect /?** at the command prompt.

ping.exe: When your network is experiencing technical difficulties, this simple troubleshooting utility will tell you whether two computers are talking to each other. Just type **ping**, a space, and the network name or IP address of the problem computer. If it reports a reply, you'll know that the connection is okay. You can also use this command to confirm that your own Internet connection is working.

recover.exe: If you lose a file to a corrupt sector on an NTFS disk, this command restores as much of the lost data as possible. Type **recover** followed by a space and the full path and name of the file you want to resuscitate. No wild-card characters are allowed in the specified file path, and you can recover only one file at a time when using this command.

runas.exe: People who log in to a non-administrator Windows account (which Microsoft recommends for security reasons) may think that they have to log off and back on to perform administrator-only tasks. Not so! This command launches a program as if you were another user. Just type **runas /user:** followed by the name of the profile under whose auspices you want to run the application, then a space and the program's name. (Use the **/?** switch to get details on the exact form to use with this command.) You will, of course, be prompted for that profile's password before the program launches.

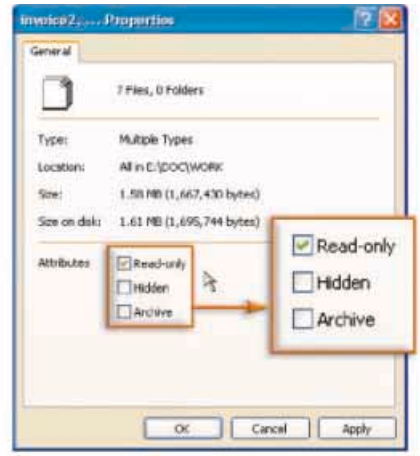


FIGURE 3: THE 'ATTRIB' command lets you change the attributes of several files at once.

sort.exe: To sort the items in a text file alphabetically, type **sort**, a space, the name of the file, another space, the greater-than symbol (**>**), another space, and the path and name of the file in which the sorted entries will appear (for example, you might type **sort messylist.txt > neatlist.txt**). Add the **/r** switch at the end if you want the list to appear in reverse alphabetical order.

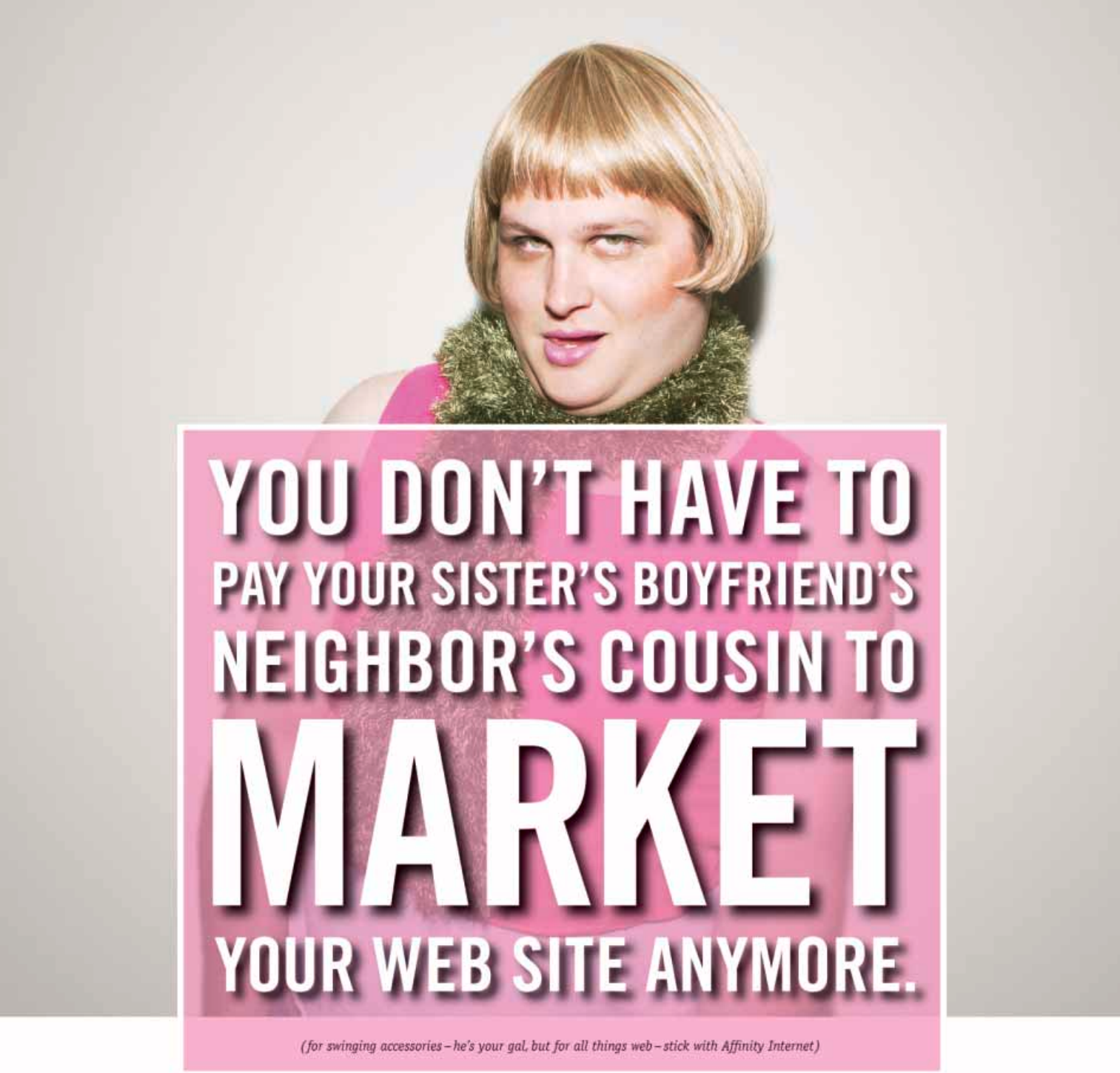
taskkill.exe: You could use Windows XP's Task Manager to close any running application or process, but this utility not only closes one app, it also lets you stop multiple programs at once via wild cards and filters. For example, to shut down all applications that are not responding, type **taskkill /fi "status eq not responding"**. For more options, consult the help screen. ■

Send Windows-related questions and tips to scott_dunn@pcworld.com. We pay $50 for published items. Visit find.pcworld.com/31607 for more Windows Tips. *Scott Dunn is a contributing editor for* PC World.

WINDOWS TOOLBOX

Get More File-Management Muscle With XXCopy

WINDOWS' XCOPY command is useful for copying all the files and folders in a directory, but its options are limited. XXCopy, a freeware replacement from Pixelab, adds the ability to copy files with long names while preserving their short names (see find.pcworld.com/48146 for the skinny on this complicated issue from my April 2001 *Windows Tips* column). The program also includes features for making backups, synchronizing folders, and more. No lover of batch files should be without it. XXCopy is free for personal use. Visit find.pcworld.com/48148 to download it.



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HARDWARE TIPS

BY KIRK STEERS

WHAT'S THE BEST BATTERY TYPE? | GEAR UP FOR 64-BIT WINDOWS | A HANDS-FREE SCREEN BLANKER

Longer Life, Lower Cost for All Your Gadgets' Batteries

EVERYONE WHO OWNS AN MP3 player, cell phone, digital camera, or other portable device wants batteries that cost less and that last longer between recharges or replacement. These tips will help you get more power for your battery dollar.

If your PDA, camera, or mechanical bunny uses standard AA or AAA batteries, disposable alkaline ones aren't your only—or even best—choice. Eveready's Energizer E2 Titanium and other high-end alkaline batteries deliver much longer battery life for some uses. The catch: They cost $6 per four-pack online, and up to twice that at retail, about double what you would pay for standard alkaline batteries.

You pay a similar premium for lithium-based AA and AAA batteries, which also cost about twice as much as standard alkalines. However, they sometimes offer more than twice the performance, especially for such power-hungry devices as digital cameras and CD players. (Winter sports enthusiasts should note that lithium batteries perform well in cold environments.) Visit find.pcworld.com/48510 for a battery-life comparison.

FIGURE 1: LET ONE UNIVERSAL adapter, such as this Targus model, serve all your recharging needs.

By time you read this, stores should be selling Panasonic's disposable Oxyride batteries, which lasted twice as long as comparably priced alkaline batteries in *PC World* tests (see "New Batteries: Twice the Life" at find.pcworld.com/48186).

You can protect your pocketbook *and* the environment by using rechargeable batteries. Nickel–metal hydride (NiMH) batteries cost a bit more and take slightly longer to charge than nickel cadmium (NiCd) batteries, but the NiMH kind last longer (see the chart below). AA and AAA battery rechargers cost as little as $10 online, at electronics stores, and at discount chains.

To get the most out of a rechargeable battery, you have to store and recharge it properly. While most of today's gadgets use lithium ion or lithium polymer batteries, some rely on the older, less-expensive, and lower-capacity NiMH and NiCd type.

NiCd batteries need to be fully discharged before recharging to prevent "memory" problems, which can limit the battery's storage capacity when it hasn't yet been fully depleted. NiMH batteries don't suffer from memory problems, but some experts consider fully discharging the battery regularly to be beneficial. However, lithium batteries last longer if recharged when *not* fully drained.

Check with the battery's manufacturer for the best way to recharge it. And if you've had battery trouble with your IPod, you're not alone. Take a look at www.ipodbatteryfaq.com for a wealth of useful information about IPod battery issues.

Batteries start losing charge capacity from the moment they're manufactured. To minimize aging, store your batteries at 50 to 60 degrees—but don't freeze them. And for optimal long-term storage, keep your lithium, NiMH, and NiCd batteries about 50 percent charged to minimize capacity loss during long periods of nonuse. Of course, there's no easy way to determine a battery's remaining charge with any precision, so first recharge the device fully, and then use it for what you approximate is half its stan- ▶

New Batteries Pack More Power

CHOOSE THE BEST BATTERY TYPE for the power needs of your favorite gadgets.

BATTERY TYPE	Pros	Cons
Nickel cadmium (NiCd)	• Inexpensive and widely available • High number of recharges before battery wears out • Fast recharges	• Low charge capacity • Subject to memory-effect problems • Contains toxic cadmium
Nickel–metal hydride (NiMH)	• Up to 40 percent more charge capacity than NiCd • Fewer memory-effect problems	• Fewer recharges than NiCd • Battery discharges quickly when not in use
Lithium ion/ lithium polymer	• Higher charge capacity than NiCd or NiMH • No memory-effect problems • Lithium polymer type comes in many shapes	• More expensive than NiCd or NiMH

PHOTOGRAPH: MARC SIMON

dard charge duration before putting it away into cool storage.

When a rechargeable battery becomes unrechargeable, don't throw it away; recycle it. The cadmium in NiCd batteries is especially toxic. Recycling centers are easy to find; go to the Rechargeable Battery Recycling Corporation site (www.rbrc.org) for a listing of locations nationwide.

POWER ON THE GO

Any USB port in a storm: You can recharge any device that comes with an internal rechargeable battery and a USB port by connecting it to a powered USB hub, whether in your PC or a stand-alone device. USB cables are easier to carry around than the bulky "wall wart" AC power adapters that accompany most portable devices. Cell phone makers often provide USB cables as an accessory. If yours doesn't, APC (www.apc.com) carries USB adapters for various types of cell phones, most of which are less than $20 (find.pcworld.com/48188).

Targus (www.targus.com) manufactures a Universal Notebook Docking Station ($150 list; $125 online) that supplies two "always-on" USB ports for convenient charging, even when your laptop is not attached (find.pcworld.com/48511).

If you're driving, a USB adapter for your car's cigarette lighter costs less than $15 at computer stores or at such sites as 101cells.com (find.pcworld.com/48189).

One adapter to rule them all: Minimize the number of power adapters you have to carry around by using a universal power adapter such as those sold by Belkin (find.pcworld.com/48190) and Targus (find.pcworld.com/48191; see **FIGURE 1**). These light, thin adapters come with tips that fit many laptops, PDAs, cameras, and cell phones. Prices range from $80 to $150, depending on the wattage they provide.

Auto-matic AC: If you spend a lot of time in an automobile, 12V-DC–to–110V-AC power converters such as the AC Anywhere from Belkin (find.pcworld.com/48192) and the Mobile Power Inverter from Targus (find.pcworld.com/48193) deliver standard AC power from a car's cigarette lighter. You can't run a table saw from them, but they will power any small electronic device up to a laptop PC.

FIGURE 2: NEVER MISS another call. Keep your cell phone charged with the SideWinder hand generator.

PHOTOGRAPH: MARC SIMON

Spin cycle: My all-time favorite gadget for cell phones is the SideWinder cell phone charger from IST Designs (find.pcworld.com/48194). This tiny, 2.5-ounce generator allows you to manually charge your cell phone anytime, anywhere, by spinning a small crank (see **FIGURE 2**). Just 2 minutes of turning provides about 5 minutes of talking time on my Nokia cell phone. A small light on the SideWinder's case makes a handy emergency flashlight as well. The SideWinder comes equipped with a set of adapters to accommodate a wide range of cell phones.

Catch some rays: If you're going where there's no power but lots of sunshine, consider the $70 Coleman Exponent Flex 5 by ICP Solar (find.pcworld.com/48196). The flexible solar panel weighs 1 pound and folds into a 7-by-9-by-1.5-inch packet that's easy to stow and carry. Devices connect via a cigarette-lighter adapter. In full sunlight at the equator, the unit supposedly produces enough energy to charge a typical cell phone in 3 to 5 hours.

'LOOK, BOSS, NO HANDS!'

ARE THERE TIMES when you want to keep what's on your monitor away from prying eyes? The StealthSwitch (www.stealthswitch.com) is a simple floor switch that lets you quickly toss up a different window on your monitor without having to fumble for your mouse or the <Alt>-<Tab> key combo. With a mere tap of your foot, your card game—uh, I mean your sensitive document—is replaced with the screen of your choosing. The device costs $40 from H-Mod.

TAKE THE 64-BIT PLUNGE?

MY PC HAS AN Athlon 64 CPU and is currently running Windows XP Home. I'm thinking of installing the 64-bit edition of Windows XP. What are the chances of hardware incompatibilities, and what kind of hardware does my PC need to handle the new OS?

Ian Smith, Denver

KIRK'S LAW STATES: Never buy the first version of a hardware or software product. You may think this sounds like cynical advice, but over my many years of computing it has proven to be sound.

If you're set on switching to 64- bit Windows, first go to find.pcworld.com/47544 to read *PC World*'s evaluation of an early release, "64-Bit Windows? Wait for Longhorn," from last July. Microsoft's minimum requirements for Windows XP X64 aren't too intimidating: a 64-bit CPU with a clock speed of at least 733 MHz, 1GB of RAM, and 1.5GB of free disk space. If you do install the new OS, I expect that your biggest hardware headaches will involve device drivers. Most devices requiring a driver utility will need a new 64-bit version. Windows XP X64 will include drivers for many, but not all, current devices. Hard drives, optical drives, and other devices that connect via ATA or newer SATA ports, for example, shouldn't pose a problem. But I guarantee that a few printers, network cards, and other older devices, especially those from lesser-known manufacturers, will be left driverless under XP X64, just as they were during the transition to Windows XP a few years back, and during every other major OS upgrade as it rolled out. ■

Go to find.pcworld.com/31511 for past Hardware Tips *columns. Send your tips and questions to kirk_steers@pcworld.com. We pay $50 for published items. Kirk Steers is a* PC World *contributing editor.*

INTERNET TIPS

SCOTT SPANBAUER

Put Your Favorite Media Player on Its Best Behavior

PLUMBING, STREET sweepers, your PC's media players, bicycle chains: What do they have in common? We take them for granted—as long as they're working properly. Follow these tips to make sure your media player does things your way.

WINDOWS MEDIA PLAYER 10

IN GENERAL, I'M ALL for alternatives to Microsoft products, but if you don't use an IPod, and you like having some choices when shopping for media files online, Windows Media Player 10 (find.pcworld.com/48424) is a great fit for you. The Electronic Frontier Foundation (find.pcworld.com/48198) may be correct in thinking that digital rights management is a bad idea, but Microsoft's new player makes it a pretty easy evil to live with. Nevertheless, you should keep a few things in mind to avoid DRM hassles.

First, be sure to back up your licenses. When you purchase an audio or video file through one of the services in WMP 10's list of online stores, it will probably come encrypted and accompanied by a digital rights license. Without the license, you can't play the file. Backing up your media licenses lets you restore files that become corrupted, and lets you move the files to another PC. Reinstalling Windows or changing your PC's hardware may invalidate the licenses on your PC, making a backup a must. To create a copy of your licenses in Windows Media Player 10, right-click the player's toolbar and select *Show Menu Bar*. Choose *Tools•Manage Licenses*, click *Change* to select the destination folder or device for your license backup, choose *OK*, and then click *Back Up Now*.

To restore backed-up licenses, reopen the Manage Licenses dialog box and click *Restore Now*, but do this only if you really have to—Microsoft limits the number of times you can restore licenses, and the number of PCs you can transfer licenses to (see the company's license FAQ at find.pcworld.com/48200 for the details).

Second, to avoid the DRM license hassle altogether when you rip your own CDs (or copy tracks to your hard disk), make sure that Windows Media Player doesn't do any encrypting. To disable automatic encryption, choose *Tools•Options*, select the *Rip Music* tab, and uncheck *Copy protect music*. Alternatively, you may choose *mp3* in the Format list as the audio format you're ripping to—unlike previous versions, Windows Media Player 10 includes an MP3 encoder. Click *OK* to finish.

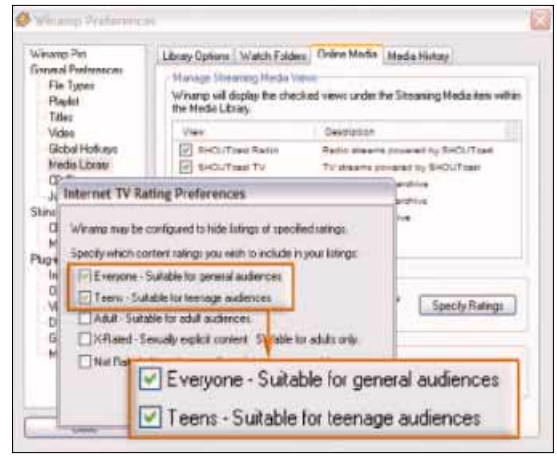

FIGURE 1: MAKE THE WINAMP media player safe for children and teens by checking these settings under 'Online Media'.

SANITIZE WINAMP

IF YOU ENJOY the diversity of Internet radio, you might use AOL subsidiary Nullsoft's Winamp 5.09 player (find.pcworld.com/48202). Besides being highly configurable (with skins and plug-ins galore available at winamp.com/plugins), Nullsoft's Shoutcast service puts a wealth of Internet radio and TV streams at your disposal. Unfortunately, Winamp's Internet TV selection may be a little too wide-ranging for some people: Among the Radiohead videos, pirate reruns, and eastern European news stations, you're likely to find more than a smattering of hard-core porn.

To return your version of Winamp to a PG rating, choose *Options•Preferences*, select *Media Library* under General Preferences in the left panel, select the *Online Media* tab, and click *Specify Ratings* under the 'Internet TV Ratings Preferences' subheading. Now simply uncheck the types of videos you don't want to see in Winamp (see **FIGURE 1**). When you're done, click *OK* and *Close*. To cleanse the Media Library of all traces of objectionable material, select *Recent Items*, right-click an item in the list, choose *Select All*, and then press *Delete* to clear the list. Doing this in the Recently Played list removes those items from Winamp's Media Library listing, but not from your system's hard drive. ■

Send your questions and tips to nettips@spanbauer.com. We pay $50 for published items. Go to find.pcworld.com/31523 for more Internet Tips. *Scott Spanbauer is a contributing editor for* PC World.

CONVERT VIDEO FORMATS

NO MATTER HOW many video players you have on your PC, you'll occasionally want to convert a video file from one format to another—say, from QuickTime's .mov to MPEG. Though lots of commercial programs can perform such conversions, The RAD Video Tools, a utility created by RAD Game Tools (find.pcworld.com/48204), does the job for free.

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STEP BY STEP

BECKY WARING

Give Your Wi-Fi Network Wider Range, More Speed

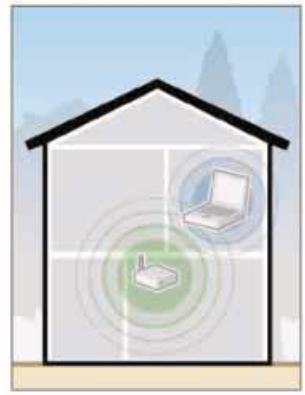
ALL THE TALK ABOUT Pre-N or MIMO Wi-Fi equipment that can triple a network's range and speed may have you thinking it's time to trade in your 802.11b or g gear. (Visit find.pcworld.com/48176 for a report on our tests of these high-speed Wi-Fi technologies.) But a new wireless router and adapters for all your PCs could cost you $200 or more. And then you have to consider the hassle of re-installing and reconfiguring your network.

You may also balk at upgrading network equipment that might be only two years old (or less). Whether it's a matter of repositioning the access point in your home, moving house plants and other items that block your Wi-Fi signal, or upgrading just one or two key network components, there are less expensive—even free—ways to extend the range and increase the speed of your existing network. (Browse to find.pcworld.com/48786 for some networking basics in Stan Miastkowski's May 2004 *Step-By-Step* column, "How to Build a Safe, Secure Network.") ■

Becky Waring is a freelance writer and former editor of NewMedia Magazine.

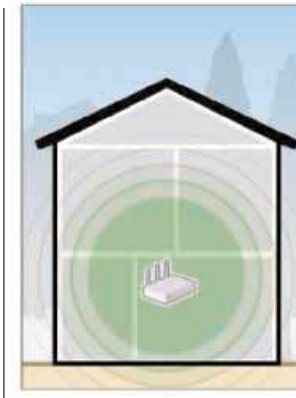
WIRELESS NETWORK MAKEOVERS: FROM FREE TO FULL-BLOWN

1 Relocate your router (free): Place your router in a central room on the ground floor, as high off the ground as possible. To avoid blocking the signal, keep the device away from metal, concrete, or stone walls, and far from your water heater and other water tanks. Large house plants and even CD collections can be other obstructions. Common sources of interference are 2.4-GHz cordless phones (use 900-MHz or 5-GHz models) and your neighbors' Wi-Fi networks operating on the same channel. Change your router's channel if necessary: Channels 1, 6, and 11 provide maximum distance from potentially overlapping signals.



2 Upgrade your cards (about $45 to $70): An extended-range card such as SMC's Elite-Connect Universal High Power Wireless CardBus Adapter (about $70 online; find.pcworld.com/48398) or the Hawking Hi-Gain Wireless-G Laptop Card HWC54D (about $50 online; find.pcworld.com/48400) may get rid of dead spots. These cards are ideal for use at hotspots, too. You can install an extended-range card even if your laptop has built-in 802.11b. To achieve the same extended range for desktop PCs, try Hawking's Hi-Gain USB Wireless-G Adapter HWU54D (about $45 online; find.pcworld.com/48402).

3 Use a range extender (about $80 to $115): If your house has an area where coverage is poor, consider buying a wireless range extender. The Netgear 54Mbps Wall-Plugged Wireless Range Extender Kit WGXB102 (about $115 online; find.pcworld.com/48394) lets you add a dedicated Wi-Fi network to any room that has a power outlet. Hawking's Wireless-G Range Extender HWUR54G (about $80 online; find.pcworld.com/48396) differs from the Netgear device by repeating wireless signals from your existing router, so it should be placed about halfway between the main router and the area that needs coverage.



4 Replace your router and card (about $100 to $200): Replacing your existing router and card with enhanced 802.11g or MIMO equipment is the surest way to eliminate dead spots—and even extend coverage to your yard. D-Link claims that its DI-624M Super G With MIMO Wireless Router (about $110 online; find.pcworld.com/48404) provides up to eight times the coverage of a standard 802.11g router. You don't need to replace every adapter card. In our tests, MIMO routers increased the range of regular 802.11g cards dramatically. Buy the high-speed router first, and then decide which adapters to upgrade.

INFOGRAPHICS: DIEGO AGUIRRE

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Preserve Your Most Vital Data for the Long Haul

HOW DO I SAFELY store important data for many years?

David Donovan, via the Internet

NO ONE HAS a definitive answer on the best way to preserve your digital information. But the following recommendations will improve your odds of having a legible data archive at hand for years to come.

Choose the right format: Use file formats for your data archive that you'll be able to open 20 (or more) years from now. The most likely candidates are formats that everyone uses and that many programs support, such as .bmp (bitmap), .tif (TIFF), and .jpg (JPEG) for image files; and .doc (Microsoft Word), .htm (HTML), and .txt for text files. (Remember that if an image to be saved isn't already a JPEG, keeping it as an uncompressed TIFF will preserve more details.) For an extra level of security, use at least two of these formats for each file you want to keep.

Use write-once discs: Of course, the file formats you use for your archive are irrelevant if the physical media the files are stored on become unreadable or if technology companies stop making drives that can read them. Again, think ubiquity. Today, so many manufacturers produce CD and DVD drives that some are bound to continue to do so for a long time. But only Iomega makes the Rev and Zip drives, for example—if the company stops making them, getting data off those cartridges will become very difficult.

Go with CD-R or DVD±R discs; stay away from RW media. The primary advantage of RW—the ability to erase and write over data—isn't an advantage if you're saving something for good. More important, RW discs aren't as stable as R discs.

Avoid packet-writing software: When you preserve your data, don't use tools such as Drag-to-Disc (in the Roxio Easy Media Creator suite) or InCD (in the Nero suite) that allow you to write to the disc directly from Windows Explorer. Instead use a good, basic authoring program, such as Easy Media Creator's Creator Classic.

Make multiple copies: Having extras on hand increases the chances that one will survive. As mentioned above, use two or more different formats, where possible.

Store them properly: Optical discs like a cool, dry place away from direct sunlight.

Check them regularly: Every few years, take the discs out of their storage, insert them in your PC, and make sure you can still read all the files they contain.

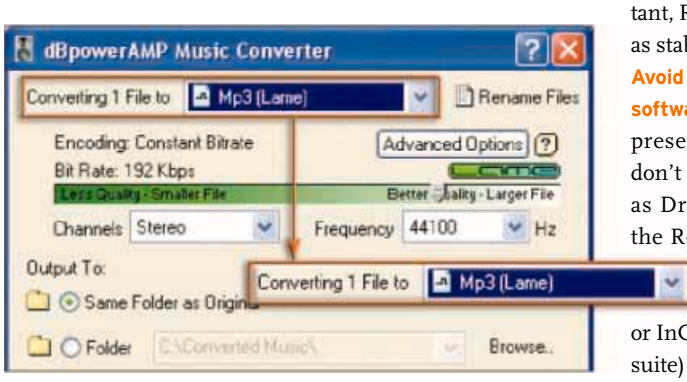

FIGURE 1: SWITCH YOUR AUDIO FILES from one format to another by using this option in the DBpowerAMP Music Converter utility.

CONVERT AUDIO FILES

I'VE GOT A LOT of Windows Media Audio (WMA) files and an audio player that doesn't support that format. Can I convert the files to MP3?

Tom E. Hughes, Moraga, California

MAYBE, BUT IT'S BEST not to. Both formats use lossy compression, which saves storage space but reduces the sound quality. When you convert from one lossy format to another, you hurt the quality twice.

If possible, rerecord your tunes from their CD or other source as MP3s. If you don't have an MP3-ripping program, use Microsoft's free Windows Media Player 10 (find.pcworld.com/48074).

You can't convert copy-protected WMA files, including songs purchased from Musicmatch or Napster—as well as tracks you've ripped with WMP's default setting. To find out if a WMA file is protected, right-click it and select *Properties;* if there's a License tab, the file is protected.

If you don't have a program that converts audio formats, try DBpowerAMP Music Converter (find.pcworld.com/48075; see **FIGURE 1**). It's a free program if you're converting MP3s to WMAs, but after 30 days you must pay $14 to keep converting WMAs to MP3 format. ■

Send questions to answer@pcworld.com. Answer Line *pays $50 for published items. See find.pcworld.com/31577 for additional* Answer Line *columns. You'll find Contributing Editor Lincoln Spector's humorous and other writings at www.thelinkinspector.com.*

PASSWORD PROTECTION THAT TAGS ALONG WITH YOU

LAST FEBRUARY I recommended the free program Password Safe for managing passwords (see find.pcworld.com/48078). Jim Moore of Panama City, Panama, points out that unlike most Windows programs, Password Safe runs on PCs without being installed on the hard drive. You can put the program on a USB memory key, encrypt and store your data on the device, and access your passwords on any computer. Browse to find.pcworld.com/47574 for your copy.

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STEPHEN MANES

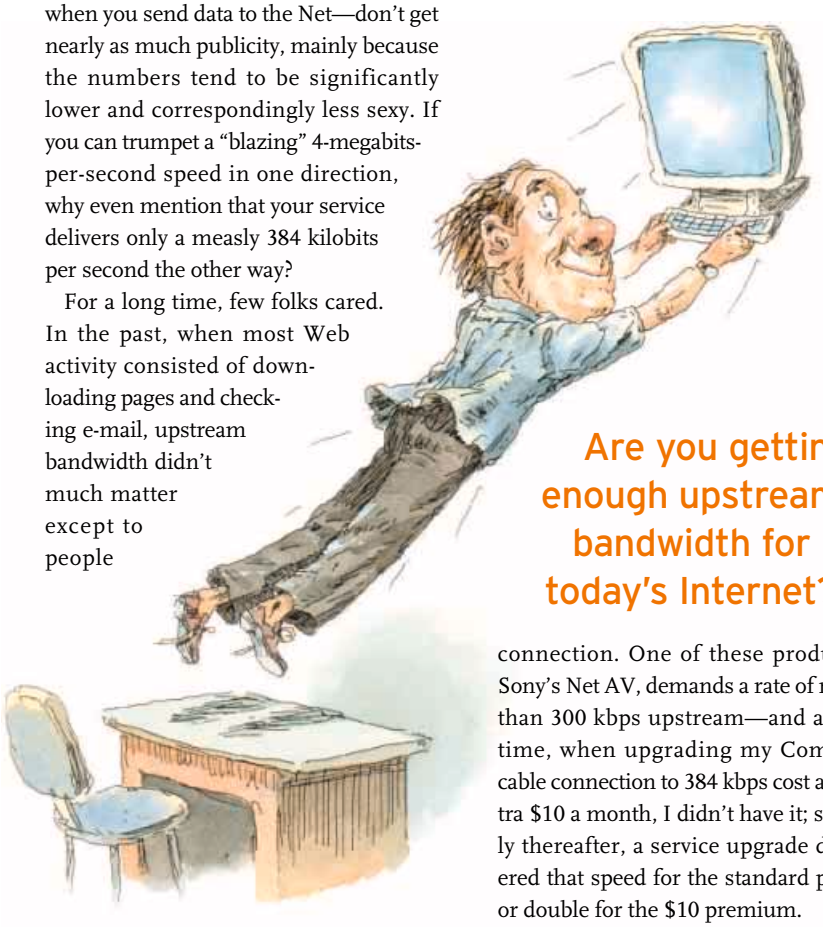
Broadband Speed That'll Send You

AS BROADBAND PROVIDERS revamp and improve their services, they increasingly offer more bandwidth per buck, too. But another encouraging trend often gets lost among the escalating megabits: Connection speeds in almost every venue are improving upstream as well as down.

Providers generally tout downstream bandwidth numbers—the speeds (typically characterized as "blazing") you can expect (at 2:00 in the morning, anyway) when you download data from the Internet. Upstream speeds—what you obtain when you send data to the Net—don't get nearly as much publicity, mainly because the numbers tend to be significantly lower and correspondingly less sexy. If you can trumpet a "blazing" 4-megabits-per-second speed in one direction, why even mention that your service delivers only a measly 384 kilobits per second the other way?

For a long time, few folks cared. In the past, when most Web activity consisted of downloading pages and checking e-mail, upstream bandwidth didn't much matter except to people who happened to be running a server. But now upstream is starting to matter a lot.

I realized this recently when I began testing products that let you send TV up the wire from your house to the Internet and watch it anywhere you have a Net connection. One of these products, Sony's Net AV, demands a rate of more than 300 kbps upstream—and at the time, when upgrading my Comcast cable connection to 384 kbps cost an extra $10 a month, I didn't have it; shortly thereafter, a service upgrade delivered that speed for the standard price, or double for the $10 premium.



Are you getting enough upstream bandwidth for today's Internet?

Place-shifting TV is only one reason you might want more upstream bandwidth. If you've ever spent time waiting while a bunch of 7-megapixel photos uploaded to an online printing service or twiddling your thumbs while using an online backup service, you'll understand the benefits of swimming upstream faster. If one family member is uploading big PowerPoint files to the corporate server while someone else is having a video chat and yet another user is sitting in a hotel halfway around the world, sucking TV from the home Media Center PC over a service such as Orb, the flow of traditional upstream bandwidth may begin to feel like a trickle.

To see what kind of bandwidth you get now, use the tests at BroadbandReports.com (www.broadbandreports.com/tools). Providers sometimes upgrade current customers free of charge; but to increase your upstream oomph, you may have to shop around and compare. Qwest's basic DSL service, for example, offers 256 kbps down and up. But whether you pay Qwest extra for 1.5-mbps downstream service or even more for 3 mbps, your upstream rate will max out at 896 kbps.

If you do upgrade, test the new service once it has been installed, to make sure that you're getting what you pay for. Although in most cases broadband service providers won't guarantee a specific minimum data transfer speed, you shouldn't pay a premium for what you don't get—whether upstream or down. ■

Contributing Editor Stephen Manes is cohost of PC World's Digital Duo *(www.pcworld.com/digitalduo) on public TV. Visit find.pcworld.com/31595 for more* Full Disclosure *columns.*

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